

# 356

MIKHAYLOV, B. B., ZHERDEVA, L. G., KARASEVA, A. A., VOZNESEMSKAYA, E. V.,  
ALTSHULER, A. E., KROL, B. B., OROCHKO, D. I., AKIMOV, V. S., AGAFONOV, A. V.,  
DRUZHININA, A. V.

"Production of Lubricating Oils and Paraffin from Sulfurous Oils  
in the USSR."

Report submitted at the Fifth World Petroleum Congress, 30 May -  
5 June 1959. New York City.

MIKHAYLOV, B.G.

Category : USSR/General Problems - Problems of Teaching

A-3

Abs Jour : Ref Zhur - Fizika, No 3, 1957, No 5526

Author : Mikhaylov, B.G.

Title : Concerning the Problem of the Connection Between the Courses  
in Physics and Chemistry in the Secondary School.

Orig Pub : Uch. zap. Yelabul'sk. ped. in-sta, 1956, 1, 85-136

Abstract : No abstract

Card : 1/1

UL'YANOV, N.A., kand.tekhn.nauk; MIKHAYLOV, B.I.

Performance of the elastic driving wheel on hard-surface ground.  
Avt. prom. no.5:25-27 My '60. (MIRA 14:3)

1. Sibirskiy avtodorozhnyy institut.  
(Automobiles—Wheels—Testing)

MIKHAYLOV, B.I., inzh.; UL'YANOV, N.A., kand.tekhn.nauk

Automatic adjustment of motor grader operations. Stroiki dor.  
mashinostr. 5 no.7:6-7 JI '60. (MIRA 13:7)  
(Automatic control)  
(Graders (Earthmoving machinery))

9.6110

26241  
S/119/61/000/008/008/008  
D215/D302

AUTHOR: Mikhaylov, B.I.

TITLE: Transistor anemometer

PERIODICAL: Priborostroyeniye, no 8, 1961, 27 - 28

TEXT: This paper describes the construction, operation and application of a portable transistor anemometer designed for use in research and scientific work. The instrument is capable of measuring the velocities of gases ranging from 1 cm/sec to several tens of meters per second. In the working temperature range of 0° to 60°C the performance is stable, and the error does not exceed 2 %. The instrument is driven from a battery. The power consumption is 0.12 watts. The unit is connected to a measuring fork by means of a flexible tube. The fork consists of a tubular root with a transmitter at one end and a handle at the other. The transmitter is electrically connected to the electronic unit by means of 3 conductors, two of them being screened and the screen itself acting as the fourth conductor. The circuit diagram is shown in Fig. 2.  
Card 1/3

Transistor anemometer ...

76241  
S/119/61/000/008/008/008  
D215/D302

The transmitter consists of a bridge energized by a sinusoidal oscillator.  $T_1$  and  $T_2$  are electrically identical sundry elements located in pointed hollow heads. The working transmitter head  $T_1$  has two openings 0.7 mm in diameter, located on the axis of symmetry. The diameter of the openings is increased if air velocities exceed 6 m/sec. The resistance of the thermistors depends on the velocity of medium and their temperature difference.  $T_2$  is an ambient temperature compensating thermistor. The unbalance signal is amplified and the output current, proportional to the velocity of gas passes through an indicator (50  $\mu$ A f.s.d.).  $T_3$  is a correcting thermistor.  $k_6$  is a balancing potentiometer. The amplifier is temperature stabilized by means of a.c. and d.c. negative feedbacks. The power supply is 6 volts. The compensating capacitor  $C_5$  (560 pF) is used only if the bridge cannot be balanced. There are 2 figures.

Card 2/3

S/119/62/000/001/005/011  
D201/D302

AUTHOR: Mikhaylov, B.I.

TITLE: A shunt temperature compensated thermistor thermometer

PERIODICAL: Priborostroyeniye, no. 1, 1962, 19 - 20

TEXT: The author gives a short analysis of the method of design and the characteristics of a shunt compensated thermistor thermometer for remote measurement of the temperature range - 22 to + 85°C  $\pm 1\%$  (practically independent of temperature), simultaneously at 9 control points. The circuit (Fig. 1b) employs resistors  $R_1$  (VS) having a negative temperature coefficient of approximately 0.0007. The temperature compensating shunt is connected across the galvanometer. It consists of resistors  $R_1$  and  $R_2$  and a thermistor T. Part of the current flows in the shunt and if at a constant signal the current changes owing to a change in the ambient, the shunt will compensate this current variation, the current flowing through the galvanometer will remain constant and depend only on the value of the signal. The galvanometer, the shunt and the circuit of the sensor.

Card 1/2

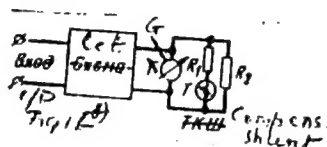


A shunt temperature compensated ...

S/119/62/000/001/005/011  
D201/D302

sing element form a bridge and this is adjusted so that the zero deflection corresponds to  $-22^{\circ}\text{C}$  and max. deflection to  $+85^{\circ}\text{C}$ , which means that the value of  $R_1$  is equal to the resistance of the thermistor at  $-22^{\circ}\text{C}$ . The sensing element consists of a high value (4.56 kilo ohms) thermal resistance type KMT. Because of a large spread in thermal resistance and thermistor characteristics, every instrument has to be individually calibrated. There are 4 figures.

1b.



Card 2/2

MIKHAYLOV, B.I.

Inertialess electric speedometer. Priborostroenie no.4:19-20  
Ap '62. (Speedometers) (MIRA 15:4)

NIKITINA, A.N.; ~~TER-SARKISYAN~~, G.S.; MIKHAYLOV, B.M.;  
MINCHENKOVA, L.Ye.

Fluorescence of solutions of certain substituted polyenes.  
Opt. i spektr. 14 no. 5:655-663 My '63. (MIRA 16:6)

(Unsaturated compounds—Spectra)

MIKHAYLOV, B.M., konstruktor; KOLOMIYER, M.G., konstruktor.

New small-sized roller. Avt.dor. 19 no.1:24-25 Ja '56.(MLRA 9:5)  
(Rollers (Earthwork))

MIKHAYLOV, B.M.

Role of vegetative cover in lateral weathering in the mountain  
regions of the Liberian Shield. Dokl. AN SSSR 157 no.4:856-858  
Ag '64 (MIRA 17:3)

1. Predstavleno akademikom P.M. Strakhovym.

BOYTSOVA, Ye.P.; MAZINA, Ye.A.; MIKHAYLOV, B.M.; OVECHKIN, N.K.;  
ROSSOVA, S.M., redaktor; GUMOVA, O.A., tekhnicheskikiy redaktor.

[Geology of the southwestern region of the Turgay Gates]  
Geologiya iugo-zapadnoi chasti Turgaiskogo progiya. Moskva, Gos.  
nauchno-tekhn. izd-vo lit-ry ip geologii i okhrane nedr, 1955.  
154 p. (Leningrad. Vsesoiuznyi geologicheskii institut. Trudy,  
vol. 5). (MLRA 9:5)

(Turgay Gates--Geology, Stratigraphic)

MIKHAYLOV, B.M.

Determining indices of refraction of clay fractions of rocks by  
means of the Fedorov stage. Inform.sbor.VSEGEI no.2:68-71 '55.

(MLRA 9:11)

(Refractive index)

(Clay--Optical properties)

MIKHAYLOV, B.M.

Results of staining mixtures of clayey minerals with methylene blue.  
Inform.sbor.VSNOI no.2:71-76 '55. (MLRA 9:11)  
(Methylene blue) (Clay)



MIKHAYLOV, B.M.

Montmorillonite from variegated lower Cretaceous deposits of Kiya  
Valley in Western Siberia. Uch.zap.Len.un no.188:108-116 '55.

(NLRA 9:8)

(Kiya Valley--Montmorillonite)

MIKHAYLOV, B. M.

Mineralogical and petrographical characteristics of clay formations  
of the upper Cretaceous and Paleocene in a section of the Pokurskaya  
key well in Western Siberia. Mat. VSEGEI Litol. no.1:77-91 '56.

(Khanty-Mansiysk National Territory--Clay)

(MIRA 11:2)

MIKHAYLOV, B.M.

Effect of absorbed cations on the color of suspensions of clays of  
different mineralogical composition, stained with methylene blue.  
Mat. VSEOEI Litol. no.1:159-161 '56. (MIRA 11:2)  
(Clay) (Cations)

APUKHTIN, N.I.; BOGRETSOVA, T.B.; BOCH, S.G. [deceased]; GENESHIN, G.S.;  
GOLUBEVA, L.V.; GROMOV, V.I.; KRASNOV, I.I.; MIKHAYLOV, B.M.;  
NIKIFOROVA, K.V.; NIKOLAYEV, B.I.; POKROVSKAYA, I.M.; POPOV, V.V.;  
PRINTS, R.N.; RAVSKIY, E.I.; SHANTSER, Ye.V.; EPSHTEYN, S.V.;  
YAKOVLEVA, S.V.; FEODOT'YEV, K.M., redaktor izdatel'stva; KASHINA,  
P.S., tekhnicheskiy redaktor

[Concise field manual for a comprehensive geological survey of the  
Quaternary] Kratkoe polevoe rukovodstvo po kompleksnoi geologicheskoi  
s"emke chetvertichnykh otlozhenii. Sost. N.I. Apukhtin i dr.  
Moskva, 1957. 201 p. (MLR 10:9)

1. Akademiya nauk SSSR. Geologicheskii institut. 2. Morkovskiy  
geologo-razvedochnyy institut (for Shantser). 3. Geologicheskii  
institut Akademii nauk SSSR (for Nikiforova, Ravskiy, Golubeva)  
3. Vsesoyuznyy Nauchno-issledovatel'skiy geologicheskii institut  
Ministerstva geologii i okhrany neдр SSSR (for Geneshin, Bogretsova,  
Mikhaylov). 4. Voenno-inzhenernaya akademiya im. Kuybysheva (for  
Popov). 5. Treст "Mosgeolnerud" (for Prints). 6. Severo-Zapadnoye  
geologicheskoye upravleniye (for Apukhtin)  
(Geology, Stratigraphic)

MIKHAYLOV, K.M.

VIKULOVA, M.F.; ZVYAGIN, B.B.; MIKHAYLOV, K.M.; BERLIN, T.S.; ORESHNIKOVA, Ye.I.; SHAKHOVA, R.A.; IVANOVA, I.I.; TATARINOV, P.M., prof., red.; GEYSLER, A.H., prof.red.; DOMINIKOVSKIY, V.H., kand.geologo-mineralogicheskikh nauk, red.; KHIPOVICH, Yu.M., kand. geologo-mineralogicheskikh nauk; SMUROV, A.A., kand. geologo-mineralogicheskikh nauk; FRANK-KAMENETSKIY, V.A., kand. geologo-mineralogicheskikh nauk; BABINTSEV, N.I., red.izd-va; KRYNOCHKINA, K.V., tekhn.red.

[A methods manual on the petrographic and mineralogical study of clays]  
Metodicheskoe rukovodstvo po petrografo-mineralogicheskomu izucheniiu glin; trudy Instituta. Sost. kollektivom avtorov pod rukovodstvom M.F. Vikulovoi. Moskva, Gos. nauchno-tekhn. izd-vo lit-ry po geol. i okhrane nedr, 1957. 447 p. (MIRA 11:2)

1. Leningrad. Vsesoyuznyy geologicheskii institut. 2. Chlen-korrespondent AN SSSR (for Tatarinov)  
(Clay)

MIKHAYLOV, B.M.

Indirect determination of the iron content in loose oolitic  
ores. Razved. i okh.nedr 24 no.10:23-25 O '58.

(MIRA 12:2)

1. Vsesoyuznyy geologicheskii nauchno-issledovatel'skiy institut.  
(Oolite) (Iron)

MIKHAYLOV, B.M.

Determining the danger of silicosis from fine dispersed rocks.  
Inform.sbor. VSEGEI no.16:143-148 '59. (MIRA 15:3)  
(LUNGS--DUST DISEASES)

MIKHAYLOV, B.M.

Methods and problems of lithofacies mapping in closed  
areas. Trudy VSEGEI 72:21-27 '62. (MIRA 15:9)  
(Geology—Maps)



MIKHAYLOV, B.M.

Lithofacies maps in geological surveying of closed areas.  
Sov. geol. 6 no.7:136-140 J1 '63. (MIRA 16:8)

1. Vsesoyuznyy nauchno-issledovatel'skiy geologicheskii  
institut.

0901 1722

L 6911-66 EMT(m)/EMP(k)/EMA(o)/I/EMP(b)/EMP(v)/EMP(t) LJP(o) JD/EM  
ACCESSION NR: AP3000060 8/0286/64/000/021/0068/0068

AUTHOR: Glasunov, E. G.; Grudeva, L. A.; Moiseyev, V. N.; Poylavko-Mikhaylov, M. V.; Khorev, A. I.; Mikhaylov, E. N. 45 B

TITLE: Filler material for welding titanium alloys with a high content of  $\beta$ -phase. Class 49, No. 166221 4455,27

SOURCE: Byul. izobr. i cover. snakov, no. 21, 1964, 68

TOPIC TAGS: titanium, titanium alloy, beta titanium alloy, welding, filler wire, electrode wire

ABSTRACT: This Author Certificate introduces a titanium-base filler alloy for welding titanium alloys with a high content of  $\beta$ -phase. To make the filler suitable for any such titanium alloys and to improve the ductility of the weld metal, the filler alloy contains 1-12 Al and 8-10% Mo.

ASSOCIATION: none

SUBMITTED: 16Oct61

ENCL: 00

SUB CODE: MM, 12

NO REF ROW: 000  
Card 1/1 20

OTHER: 000

ATD PAGES: 8146

TER-SARKISYAN, I.S.; MIKHAYL V. P.M.

Reaction of

1-(2,6,6-trimethyl-2-oxocyclohexyl)-2-ethylmercapto-1,3-butadiene  
with aldehydes. Dokl. Akad. Nauk SSSR 1982, 274, 134-136, 13.

(M RA 18:11)

1. Institut' organicheskoi khimii, Akad. Nauk SSSR, Moskva, U.S.S.R.

L 31004-66 EMT(m)/EMA(d)/EMP(t) IJP(c) JD/JG  
ACC NR: AP6007782 SOURCE CODE: UR/0136/66/000/002/0080/0082

AUTHOR: Moiseyev, V. N.; Glazunov, S. G.; Mikhaylov, B. M.

37  
8

ORG: none

TITLE: <sup>18</sup>High strength <sup>27</sup>titanium alloys

SOURCE: Tavetnyye metally, no. 2, 1966, 80-82

TOPIC TAGS: titanium alloy, aluminum containing alloy, molybdenum containing alloy, vanadium containing alloy, chromium containing alloy, iron containing alloy, alloy mechanical property, alloy heat treatment, high strength alloy

ABSTRACT: A series of high strength titanium alloys containing up to 30% molybdenum, up to 6% aluminum, and small amounts of iron, chromium, and vanadium have been developed. Alloy ingots weighting up to 6 kg were melted in a vacuum arc furnace and rolled into sheets 1.2 mm thick. Sheet specimens were annealed at 800C for 30 min, furnace cooled at a rate of 2-3 C/min, annealed at 750, 800, or 850C for 15 min, water quenched, and aged at 450-500C for 4-16 hr. It was found that alloys containing 8-10% molybdenum had the highest strength, 150 kg/mm<sup>2</sup>; additions of up to 4% aluminum caused a further increase of tensile strength up to 160 kg/mm<sup>2</sup>. Further increases in strength can be obtained by alloying with 1% iron, 1% chromium, and 2-5% vanadium, which strengthen both the α- and β-phases. Seven such alloys were melted, cast into ingots weighing up to 40 kg, which were forged into 80 x 80 mm billets at

Card 1/2

UNC: 669.295:620.18

2

L 31004-66

ACC NR: AP6007782

1050—850C, and then into bars 12 or 22 mm in diameter at 950—750C. These alloys were tested in the fully annealed or heat-treated (annealed, quenched, and aged) conditions. Annealing at 800—850C for 30 min followed by furnace cooling at a rate of 2—4 C/min ensured a relatively high tensile strength, 105—125 kg/mm<sup>2</sup>, at an elongation of 14—21% and a reduction of area of 45—63%. Annealing at 800—860C followed by aging at 450—500C increased the strength to 160—170 kg/mm<sup>2</sup> and lowered the elongation to 4—9% and the reduction of area to 20—31%. Annealing at 720—800C and aging at 450—550C produced a strength of 148—155 kg/mm<sup>2</sup>, an elongation of 6—12%, and a reduction of area of 32—50%. It is concluded that  $\alpha+\beta$  alloys containing additional alloying elements can be strengthened to a high level by annealing and aging. However, prior to heat treatment they should be subjected to intensive plastic deformation at temperatures of the  $\alpha+\beta$  region. Orig. art. has: 2 figures and 3 tables.

(A2)

SUB CODE: 11, 13/ SUBM DATE: none/ ATD PRESS: 4 2 14

Card 2/2 *LC*

L 29950-66 EWP(k)/EWT(m)/I/EWP(w)/EWP(t)/ETI IJP(c) JD/HW/WB

ACC NR: AP6017298

(A)

SOURCE CODE: UR/0136/66/000/005/0080/0082

AUTHOR: Glazunov, S. G.; Moiseyev, V. N.; Mikhaylov, B. M.

ORG: none

TITLE: Heat-resistant titanium-clad titanium alloys

SOURCE: Tsvetnyye metally, no. 5, 1966, 80-82

TOPIC TAGS: titanium alloy, alloy cladding, titanium clad alloy, alloy property

ABSTRACT: Heat-resistant titanium alloys are susceptible to cracking during hot and warm rolling due to the insufficient plasticity of the metal at rolling temperatures. An attempt has been made to improve the plasticity by cladding with unalloyed titanium. Two alloys, OT4-2 (6.5% aluminum, 1.5% manganese) and an imported alloy (8% aluminum, 1% molybdenum, 1% vanadium) were clad by pack rolling. Cladding made it possible to lower the temperature of heat rolling to 1050C, which considerably reduced the effect of oxidation. Final rolling to a thickness of 2 mm was done at 750-550C. Cladding was found to lower somewhat the tensile and yield strengths but to increase the ductility. For example: clad OT4-2 alloy sheets had a yield strength of 88.8-91.2 kg/mm<sup>2</sup>, a tensile strength of 95.0-97.3 kg/mm<sup>2</sup> and an elongation of 22.5-24.5% compared to 93.4-95.6 kg/mm<sup>2</sup>, 103.7-105.5 kg/mm<sup>2</sup>, and 12.8-14.6 for unclad sheets. As the test temperature was increased, the difference became less pronounced. The ductility of unclad specimens was greatly reduced when sheets were

Cord 1/2

UDC: 669.295:621.771.8

L 29950-66

ACC NR: AP6017298

exposed to temperatures of 400—500C for 100 hr, while the ductility of clad specimens remained almost unaffected. Cladding also greatly improved the formability and weldability of both alloys. No separation of cladding from the base material was observed during any of the tests. Orig. art. has: 3 tables and 2 figures. [FM]

SUB CODE: 11, 13/ SUBM DATE: none/ ATD PRESS: 5611

Card 2/2 CC

L 23000-66 EWT(m)/EWP(w)/ET/EWP(t) IJP(c) JD/JG

ACC NR: AF6012144

SOURCE CODE: UR/0413/66/0C0/007/0060/0060

INVENTOR: Moiseyev, V. N.; Glasunov, E. G.; Mikhaylov, B. M.; Metelkin, V. Ye. <sup>40</sup><sub>B</sub>

ORG: none

TITLE: A titanium-base alloy. Class 40, No. 180351

SOURCE: Izobreteniya, promyshlennyye obraztsey, tovarnyye znaki, no. 7, 1966, 60

TOPIC TAGS: <sup>27</sup>titanium alloy, <sup>27</sup>aluminum containing alloy, <sup>27</sup>molybdenum containing alloy, <sup>27</sup>vanadium containing alloy, <sup>27</sup>chromium containing alloy, <sup>27</sup>iron containing alloy

ABSTRACT: This Author Certificate introduces a titanium-base alloy containing aluminum, molybdenum, vanadium, and chromium. To improve the mechanical properties, the alloy has the following chemical composition: 2--6% aluminum, 6--9% molybdenum, 1--3% vanadium, 0.5--2% chromium, 0--5% iron, and the rest titanium. <sup>18</sup>

[w]

SUB CODE: 11/ SUBM DATE: 06Jan65/ AT D PRESS: 4238

Card 1/1 *pla*



L 31873-65 EWT(d)/EWT(m)/ENP(w)/ENA(d)/ENP(v)/ENP(k)/ENA(h) Pf-4/Peb EM  
 ACCESSION NR: AR3005870 8/0124/64/000/011/V010/V010

SOURCE: Ref. zh. Mekhanika, Abs. 11779

AUTHORS: Mikhaylov, B. K.

TITLE: Calculation of gently-sloping shell which is rectangular in plan, with account of the compliance of two opposite edges

CITED SOURCE: Sb. Teor. mekhan., sporotivl. materialov, stroit. mekhan. L., 1964, 40-42

TOPIC TAGS: shell stability, shell structure

TRANSLATION: The author considers a shell that is rectangular in plan, has a gentle slope, is hinge-supported on two opposite edges, and is supported on elastic beams at the two other edges. Boundary conditions, in which account is taken of the flexural rigidity of the end beams in two planes and of their torsional rigidity, are set up for these edges. The solution reduces to a single eighth-order differential equation relative to the resolving function. It is

Card 1/2

L 31873-65

ACCESSION NR: AR5005070

proposed to solve this equation in terms of single trigonometric series, but the solution itself is not given. It is mentioned that the solution was obtained by the author with a computer for the case of symmetrical deformation. Without giving the results of the solution, the author confines himself to the remark that the elastic compliance of the edges must be taken into account. P. A. Lukash.

SUB CODE: AS

ENCL: 00

Card 2/2

L 46000-00 EXT(1//FC) GW

ACC NR: AR6016287

SOURCE CODE: UR/0269/66/000/001/0046/0046

AUTHORS: Sidorov, V. V.; Andrianov, N. S.; Mikhaylov, B. K.; Pokrovskiy, G. B.; Smolyakov, B. P. 57  
B

TITLE: Combined meteor station KGU-M2 ✓

SOURCE: Ref. zh. Astronomiya, Abs. 1.51.374

REF SOURCE: Sb. Meteorn. rasprostr. radiovoln. No. 2. Kazan', Kazansk. un-t, 1964, 3-19

TOPIC TAGS: meteor observation, meteor tracking, radio echo, upper atmosphere

ABSTRACT: A general discussion of the combined meteor station KGU-M2 developed at the Radio Astronomical Problems Laboratory KGU (Problemmaya radicastronomicheskaya laboratoriya KGU) is presented. The station is intended for studying the properties of the upper atmosphere by radio reflections from meteor tracks, the physics of meteoric ionization, and some problems of meteor astronomy. The main consideration is given to a description and analysis of noise prevention and station operation synchronization devices. Recommendations for its further improvement are given. Resume [Translation of abstract]

SUB CODE: 03

Card 1/1

UDC: 523.164.8

L 46881-66 EWT(1)

ACC NR: AR6016288

SOURCE CODE: UR/0269/66/000/001/0046/0046

AUTHOR: Mikhaylov, B. K.

33

8

TITLE: Indicator for recording the form of reflected pulses

SOURCE: Ref. zh. Astronomiya, Abs. 1.51.377

REF SOURCE: Sb. Meteorn. rasprostr. radiovoln. No. 2. Kazan', Kazansk. un-t, 1964, 53-58

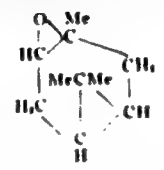
TOPIC TAGS: meteor observation, meteor tracking, radio echo

ABSTRACT: A three-dimensional indicator is described. It permits recording of reflected pulses in large scale with the simultaneous plotting of the amplitude-time characteristics of the meteor echo. The causes of possible errors with the determination of distortions occurring at reflection are considered. Abstract [Translation of abstract]

SUB CODE: 03

Card 1/1 *plw*

UDC: 523.164.8

| 1ST AND 2ND ORDERS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |  | PROCESSES AND PROPERTIES INDEX |  | 100 AND 6TH ORDERS |  |
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| <p><b>Oxide of <math>\Delta^1</math>-carene.</b> B. A. ARBUZOV AND B. M. MIKHAILOV. <i>J. Russ. Phys.-Chem. Soc.</i> 62, 607-15(1930).—<math>\Delta^1</math>-Carene (I) belongs to the group of bicyclic terpenes, widely distributed in nature, which was discovered by Simonsen (<i>C. A.</i> 14, 2617). <math>\Delta^1</math>-Carene and <math>\Delta^2</math>-carene, which was found by S. in the essential oil of <i>Andropogon lawsonianus</i> (<i>C. A.</i> 17, 91), are the first natural terpenes having the carene nucleus</p> <p><math>\text{Me}_2\text{C}=\text{CH}-\text{CH}=\text{CH}-\text{CH}_2-\text{CMe}_2-\text{CH}_2-\text{CH}_2-</math> (I) and <math>\text{Me}_2\text{C}=\text{CH}-\text{CH}=\text{CH}-\text{CMe}_2-\text{CH}_2-\text{CH}_2-</math></p> <p>S. (I) oxidized I with <math>\text{KMnO}_4</math> in alk. soln. to a careneglycol, m. 60-70°, [<math>\alpha</math>]<sub>D</sub> 10.15°, and with <math>\text{H}_2\text{O}_2</math> in <math>\text{AcOH}</math> to a glycol m. 80-1°, optically inactive in alc. and <math>\text{CHCl}_3</math> (Pillay and S., <i>C. A.</i> 22, 1930). This isomerism of glycols was presumed by him to be either a <i>cis-trans</i> or optical isomerism, wherefore the glycol m. 60-70° was named <math>\Delta^1</math>-carene-<math>\alpha</math>-glycol, and the glycol m. 80-1° <math>\Delta^1</math>-carene-<math>\beta</math>-glycol. By the action of dil. <math>\text{H}_2\text{SO}_4</math> the <math>\beta</math>-glycol loses 1 mol. of <math>\text{H}_2\text{O}</math> with formation of a mixt. of p-cymene and</p> <div style="text-align: center;">  <p>(II) which has an odor resembling limonene</p> </div> <p>and proved to be a very stable compound giving no reaction with <math>\text{Br}</math> in <math>\text{CHCl}_3</math>, and forming no hydrate on shaking for several days with dil. <math>\text{H}_2\text{SO}_4</math>. The uncommon stability of II as contrasted with the high reactivity of the oxides of <math>\alpha</math>-pinene and norpinene seems to be little understood, and is here proposed to be investigated. The <math>\Delta^1</math>-carene isolated</p> |  |                                |  |                    |  |
| <p>AND S. L. A. METALLURGICAL LITERATURE CLASSIFICATION</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |  |                                |  |                    |  |

from turpentine gives on oxidation with  $\text{BaO}_2\text{H}$  (Priekhachy, C. A. 24, 607) 70% of the oxide of  $\delta$   $\Delta^1$  carene (III), which differs sharply from II prepd. by S. & S. II (fraction 1) has 130.3°,  $d_{20}^{25}$  0.961, II (fraction 2) has 155.0°,  $d_{20}^{25}$  0.9704,  $n_D^{20}$  1.4316, III has 70.80° has 120.7°,  $d_{20}^{25}$  0.9494,  $n_D^{20}$  1.3303  $n_D^{20}$  1.124. III is a light liquid with a strong pine oil odor, and gives readily with dil  $\text{H}_2\text{SO}_4$  a hydrate, the main fraction of which is a crystalline solid, and gives readily with dil  $\text{H}_2\text{SO}_4$ , optically inactive in  $\text{CHCl}_3$ . The formation of  $\beta$ -glycol by hydration of III indicates for the  $\alpha$  and  $\beta$  glycols of  $\delta$   $\Delta^1$  carene *cis-trans*, and not optical, isomerism, whereby the lower melting  $\alpha$ -glycol is the *cis*-, while the  $\beta$ -glycol is the *trans*-isomer (Nemetkin, C. A. 20, 290). Verkade, *et al* (C. A. 23, 2005). The formation of identical glycols by hydration of an oxide and by oxidation of the corresponding unsatd. hydrocarbon with  $\text{H}_2\text{O}_2$  in  $\text{AcOH}$ , as in the case of I, was previously observed (Sword, C. A. 19, 2042). Priekhachy, C. A. 4, 916; Meerwein, C. A. 20, 2674). *Exptl. part* - From 4200 g. of Russian turpentine of unknown origin was obtained by distn. in vacuo 845 g. (20.1%) of carene fractions from which was isolated the pure  $\delta$   $\Delta^1$  carene, bp 57.8°, has 1.125°,  $d_{20}^{25}$  0.9494,  $n_D^{20}$  1.3303,  $n_D^{20}$  1.157. The nitrate of I was prepd. by known methods (C. A. 23, 4057). After recrystn. from a mixt. of  $\text{CHCl}_3$  and  $\text{MeOH}$  it decomps. 145°.  $\delta$   $\Delta^1$  Carene  $\alpha$ -glycol was prepd. by methods developed by Simonson (*ibid.*) Schmitter and Schiller (C. A. 22, 241), and Krasinski and Sokolki (C. A. 23, 4544), m. 70.1°.  $\delta$   $\Delta^1$  Carene  $\beta$ -glycol was prepd. according to Simonson (C. A. 22, 1090), m. 80.1°. The oxide of I was obtained by pouring with stirring an ice-cold soln. of 87 g. of I in 1200 cc. of anhyd.  $\text{Et}_2\text{O}$  into an ice-cold soln. of  $\text{BaO}_2\text{H}$  in 1200 cc. of  $\text{Et}_2\text{O}$  contg. 10 g. of active O. after 26 hrs. of standing the reaction mass was washed 2 times with alkali, dried with fused  $\text{K}_2\text{CO}_3$ , the  $\text{Et}_2\text{O}$  expelled and the residue (90 g.) fractionated at 12.5 mm. pressure, which finally produced the fraction bp 70.80°,  $n_D^{20}$  1.3303, yield 63.7 g. or 70%. For the hydration of the oxide of  $\delta$   $\Delta^1$  carene, 5 g. of the latter were shaken 1 hr. at room temp. with 25 cc. of 1%  $\text{H}_2\text{SO}_4$ , the ppt. of the glycol was filtered off, washed with  $\text{H}_2\text{O}$  and dried in a vacuum desiccator over  $\text{H}_2\text{SO}_4$ , recrystd. it m. 80.1°, yield 50%. The work is being continued. CHAS. BLANK

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**Thermal decomposition of cyclohexene hydrocarbons**  
N. D. Zefskii, B. M. Mikhalov and Yu. A. Artyukov  
*J. Gen. Chem.*, (U. S. S. R.), 4, 856-65; *Compt. rend. acad. sci. U. R. S. S.*, 4, 204-12 (in German 212) (1964).  
Tabulated results are given of the thermal decomposition without the use of a catalyst of cyclic hydrocarbons saturated with H<sub>2</sub>O (1.5-4 vols.). Conclusions: (the yields given in mol. percentage are based on the decomposed hydrocarbons) cyclohexene at 650° gave 79.3 C<sub>6</sub>H<sub>6</sub> and 65.2 butadiene (I); Δ<sup>1</sup>-methylcyclohexene at 600° gave 78.1 C<sub>6</sub>H<sub>6</sub> and 35.3 isoprene; Δ<sup>2</sup>-methylcyclohexene at 690° gave 64.4 I and some propylene; cyclohexene at 780° gave 69% C<sub>6</sub>H<sub>6</sub>, 39.9% I and II; methylcyclohexane at 780° gave 34.8% I; ethylcyclohexane at 780° gave 4.2% I, and decalin at 780° gave 11.6% I. The result, considerable that Waku heavy benzine (h. 100-30°), contg. considerable quantities of cyclohexene hydrocarbons, can be used for the production of diiodine hydrocarbon, can be used for the thermal decomposition under the conditions of a considerable reduction

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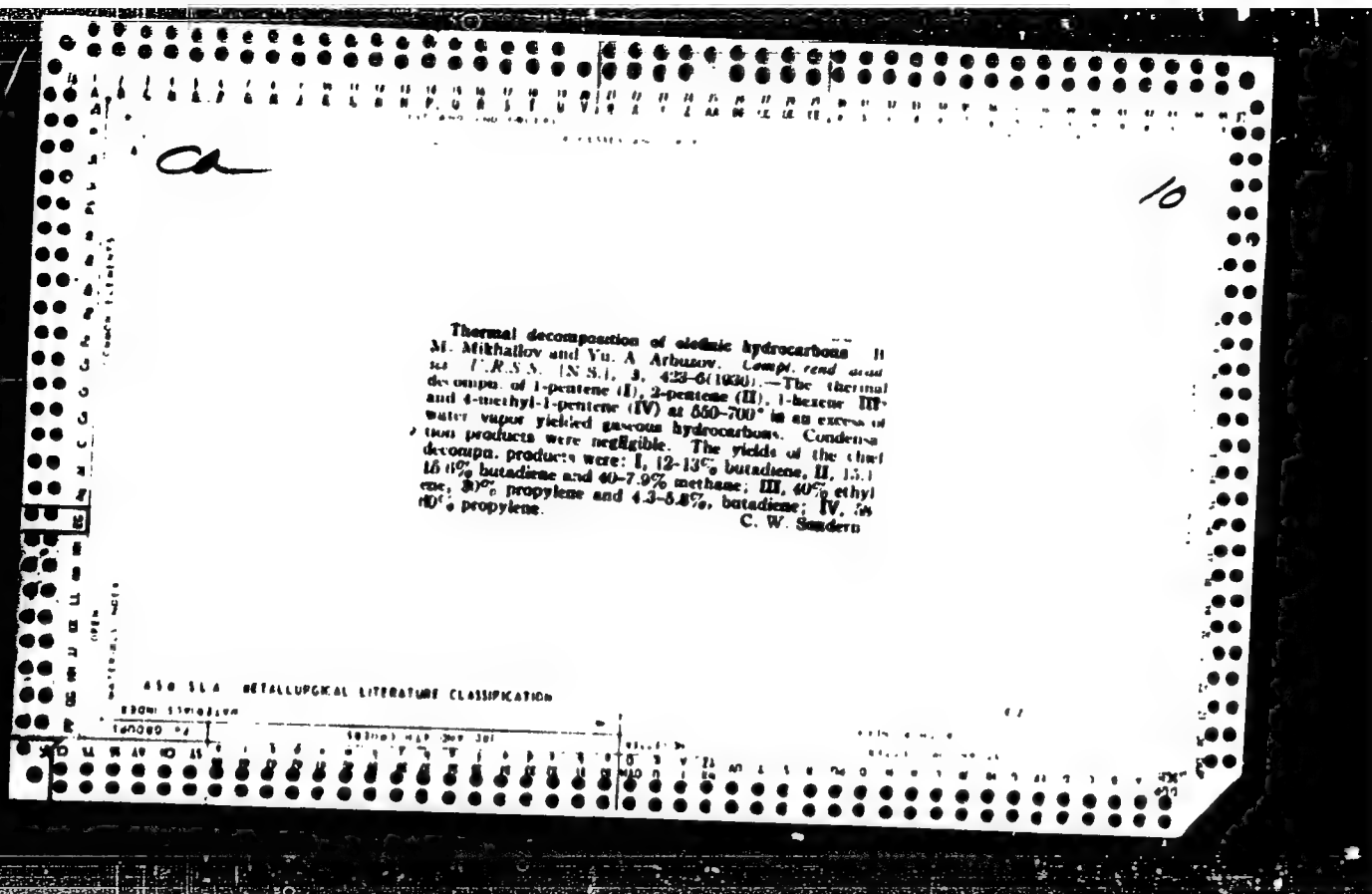
KOH (3 g.). It is photosensitive, and slowly turns orange-red behind glass. IV and Br (4 atoms) in cold  $\text{CHCl}_3$  yield the *penta-br* derivative,  $\text{C}_{10}\text{H}_2\text{OBr}_5$ , pale rose, decolors around  $170^\circ$  to an intense violet-red liquid. It is a mono-*tr* substitution and tetra-*tr* addn. compd. It is very photosensitive, and turns maroon and violet. A suspension of III (10 g.) and H<sub>2</sub>O<sub>2</sub> (5 g.) in dil. H<sub>2</sub>SO<sub>4</sub> (50 cc.) and steam-distilled, yields 15 g. of



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Thermal decomposition of dimethylcyclohexane. Yu. A. Arbusov and H. M. Mikhailov. *Compt. rend. acad. sci. U. R. S. S. (N. S.)*, 4, 537-540 (1955) (in German); cf. C. A. 29, 2182<sup>a</sup>. — At 675-750°, in the presence of 2-4 parts by wt. of H<sub>2</sub>O, the uncatalyzed thermal decomposition of 1,2-, 1,3- and 1,4-dimethylcyclohexane yields, on the basis of hydrocarbon decomposed, about 20 mol. % butadiene, together with large amts. of olefins and H and traces of CO<sub>2</sub> and C<sub>2</sub>H<sub>4</sub>. H. A. Beatty



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12-3

**Catalytic reduction of ethylene chlorohydrin.**  
**M. I. UCHAKOV and B. M. MICHALOV (J. Gen. Chem. Russ., 1937, 7, 246-253).**—Hydrogenation of  $\text{CH}_2\text{Cl}-\text{CH}_2-\text{OH}$  (I) in aq.  $\text{NaOH}$  in presence of  $\text{Ni}$ ,  $\text{Ni-SiO}_2$ , or  $\text{Pd-CaCO}_3$  results in the production of  $\text{EtOH}$  (80-90%) and  $(\text{CH}_3-\text{OH})_2$  (II) (10-20%). The probable reactions are: (I) +  $\text{NaOH} \rightarrow (\text{CH}_3)_2\text{O}$  (III) +  $\text{H}_2\text{O}$  +  $\text{NaCl}$ ; (III) +  $\text{H}_2 \rightarrow 2\text{EtOH}$ ; (II) +  $\text{H}_2\text{O} \rightarrow (\text{II})$ .  
 R. T.

ASB-51A METALLURGICAL LITERATURE CLASSIFICATION

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Condensation of dihydroproverinal with benzyl-  
 ideneacetophenone. R. M. MICHAELOV (J. Gen.  
 Chem. Russ., 1957, 7, 2025-2027); cyclohexane-  
 2:6-dione and  $\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_3$  in piperidine (18 hr. at  
 100°) yield 1-(2-benzyl-2-phenyl-1-oxoethyl)cyclohexane-  
 2:6-dione, m.p. 158-160° (monomers, m.p. 200-5-  
 202-5° (decomp.); dimeric form, m.p. 220-5-  
 221-5°), which with  $\text{NH}_4\text{OH}\cdot\text{HCl}$  in EtOH (4 hr. at  
 the b.p.) yields the oxime, m.p. 216-5-217°, of 5-  
 keto-2:6-diphenyl-3:6:7:8-tetrahydroquinoline,  
 which is obtained in two isomeric forms, m.p. 111-  
 112° and 126-5-128-5°, by hydrolysis of the oxime  
 with 25%  $\text{H}_2\text{SO}_4$  (2 hr. at 100°). R. T.

100-111-112-113-114-115-116-117-118-119-120-121-122-123-124-125-126-127-128-129-130-131-132-133-134-135-136-137-138-139-140-141-142-143-144-145-146-147-148-149-150-151-152-153-154-155-156-157-158-159-160-161-162-163-164-165-166-167-168-169-170-171-172-173-174-175-176-177-178-179-180-181-182-183-184-185-186-187-188-189-190-191-192-193-194-195-196-197-198-199-200-201-202-203-204-205-206-207-208-209-210-211-212-213-214-215-216-217-218-219-220-221-222-223-224-225-226-227-228-229-230-231-232-233-234-235-236-237-238-239-240-241-242-243-244-245-246-247-248-249-250-251-252-253-254-255-256-257-258-259-260-261-262-263-264-265-266-267-268-269-270-271-272-273-274-275-276-277-278-279-280-281-282-283-284-285-286-287-288-289-290-291-292-293-294-295-296-297-298-299-300-301-302-303-304-305-306-307-308-309-310-311-312-313-314-315-316-317-318-319-320-321-322-323-324-325-326-327-328-329-330-331-332-333-334-335-336-337-338-339-340-341-342-343-344-345-346-347-348-349-350-351-352-353-354-355-356-357-358-359-360-361-362-363-364-365-366-367-368-369-370-371-372-373-374-375-376-377-378-379-380-381-382-383-384-385-386-387-388-389-390-391-392-393-394-395-396-397-398-399-400-401-402-403-404-405-406-407-408-409-410-411-412-413-414-415-416-417-418-419-420-421-422-423-424-425-426-427-428-429-430-431-432-433-434-435-436-437-438-439-440-441-442-443-444-445-446-447-448-449-450-451-452-453-454-455-456-457-458-459-460-461-462-463-464-465-466-467-468-469-470-471-472-473-474-475-476-477-478-479-480-481-482-483-484-485-486-487-488-489-490-491-492-493-494-495-496-497-498-499-500-501-502-503-504-505-506-507-508-509-510-511-512-513-514-515-516-517-518-519-520-521-522-523-524-525-526-527-528-529-530-531-532-533-534-535-536-537-538-539-540-541-542-543-544-545-546-547-548-549-550-551-552-553-554-555-556-557-558-559-560-561-562-563-564-565-566-567-568-569-570-571-572-573-574-575-576-577-578-579-580-581-582-583-584-585-586-587-588-589-590-591-592-593-594-595-596-597-598-599-600-601-602-603-604-605-606-607-608-609-610-611-612-613-614-615-616-617-618-619-620-621-622-623-624-625-626-627-628-629-630-631-632-633-634-635-636-637-638-639-640-641-642-643-644-645-646-647-648-649-650-651-652-653-654-655-656-657-658-659-660-661-662-663-664-665-666-667-668-669-670-671-672-673-674-675-676-677-678-679-680-681-682-683-684-685-686-687-688-689-690-691-692-693-694-695-696-697-698-699-700-701-702-703-704-705-706-707-708-709-710-711-712-713-714-715-716-717-718-719-720-721-722-723-724-725-726-727-728-729-730-731-732-733-734-735-736-737-738-739-740-741-742-743-744-745-746-747-748-749-750-751-752-753-754-755-756-757-758-759-760-761-762-763-764-765-766-767-768-769-770-771-772-773-774-775-776-777-778-779-780-781-782-783-784-785-786-787-788-789-790-791-792-793-794-795-796-797-798-799-800-801-802-803-804-805-806-807-808-809-810-811-812-813-814-815-816-817-818-819-820-821-822-823-824-825-826-827-828-829-830-831-832-833-834-835-836-837-838-839-840-841-842-843-844-845-846-847-848-849-850-851-852-853-854-855-856-857-858-859-860-861-862-863-864-865-866-867-868-869-870-871-872-873-874-875-876-877-878-879-880-881-882-883-884-885-886-887-888-889-890-891-892-893-894-895-896-897-898-899-900-901-902-903-904-905-906-907-908-909-910-911-912-913-914-915-916-917-918-919-920-921-922-923-924-925-926-927-928-929-930-931-932-933-934-935-936-937-938-939-940-941-942-943-944-945-946-947-948-949-950-951-952-953-954-955-956-957-958-959-960-961-962-963-964-965-966-967-968-969-970-971-972-973-974-975-976-977-978-979-980-981-982-983-984-985-986-987-988-989-990-991-992-993-994-995-996-997-998-999-1000-1001-1002-1003-1004-1005-1006-1007-1008-1009-1010-1011-1012-1013-1014-1015-1016-1017-1018-1019-1020-1021-1022-1023-1024-1025-1026-1027-1028-1029-1030-1031-1032-1033-1034-1035-1036-1037-1038-1039-1040-1041-1042-1043-1044-1045-1046-1047-1048-1049-1050-1051-1052-1053-1054-1055-1056-1057-1058-1059-1060-1061-1062-1063-1064-1065-1066-1067-1068-1069-1070-1071-1072-1073-1074-1075-1076-1077-1078-1079-1080-1081-1082-1083-1084-1085-1086-1087-1088-1089-1090-1091-1092-1093-1094-1095-1096-1097-1098-1099-1100-1101-1102-1103-1104-1105-1106-1107-1108-1109-1110-1111-1112-1113-1114-1115-1116-1117-1118-1119-1120-1121-1122-1123-1124-1125-1126-1127-1128-1129-1130-1131-1132-1133-1134-1135-1136-1137-1138-1139-1140-1141-1142-1143-1144-1145-1146-1147-1148-1149-1150-1151-1152-1153-1154-1155-1156-1157-1158-1159-1160-1161-1162-1163-1164-1165-1166-1167-1168-1169-1170-1171-1172-1173-1174-1175-1176-1177-1178-1179-1180-1181-1182-1183-1184-1185-1186-1187-1188-1189-1190-1191-1192-1193-1194-1195-1196-1197-1198-1199-1200-1201-1202-1203-1204-1205-1206-1207-1208-1209-1210-1211-1212-1213-1214-1215-1216-1217-1218-1219-1220-1221-1222-1223-1224-1225-1226-1227-1228-1229-1230-1231-1232-1233-1234-1235-1236-1237-1238-1239-1240-1241-1242-1243-1244-1245-1246-1247-1248-1249-1250-1251-1252-1253-1254-1255-1256-1257-1258-1259-1260-1261-1262-1263-1264-1265-1266-1267-1268-1269-1270-1271-1272-1273-1274-1275-1276-1277-1278-1279-1280-1281-1282-1283-1284-1285-1286-1287-1288-1289-1290-1291-1292-1293-1294-1295-1296-1297-1298-1299-1300-1301-1302-1303-1304-1305-1306-1307-1308-1309-1310-1311-1312-1313-1314-1315-1316-1317-1318-1319-1320-1321-1322-1323-1324-1325-1326-1327-1328-1329-1330-1331-1332-1333-1334-1335-1336-1337-1338-1339-1340-1341-1342-1343-1344-1345-1346-1347-1348-1349-1350-1351-1352-1353-1354-1355-1356-1357-1358-1359-1360-1361-1362-1363-1364-1365-1366-1367-1368-1369-1370-1371-1372-1373-1374-1375-1376-1377-1378-1379-1380-1381-1382-1383-1384-1385-1386-1387-1388-1389-1390-1391-1392-1393-1394-1395-1396-1397-1398-1399-1400-1401-1402-1403-1404-1405-1406-1407-1408-1409-1410-1411-1412-1413-1414-1415-1416-1417-1418-1419-1420-1421-1422-1423-1424-1425-1426-1427-1428-1429-1430-1431-1432-1433-1434-1435-1436-1437-1438-1439-1440-1441-1442-1443-1444-1445-1446-1447-1448-1449-1450-1451-1452-1453-1454-1455-1456-1457-1458-1459-1460-1461-1462-1463-1464-1465-1466-1467-1468-1469-1470-1471-1472-1473-1474-1475-1476-1477-1478-1479-1480-1481-1482-1483-1484-1485-1486-1487-1488-1489-1490-1491-1492-1493-1494-1495-1496-1497-1498-1499-1500-1501-1502-1503-1504-1505-1506-1507-1508-1509-1510-1511-1512-1513-1514-1515-1516-1517-1518-1519-1520-1521-1522-1523-1524-1525-1526-1527-1528-1529-1530-1531-1532-1533-1534-1535-1536-1537-1538-1539-1540-1541-1542-1543-1544-1545-1546-1547-1548-1549-1550-1551-1552-1553-1554-1555-1556-1557-1558-1559-1560-1561-1562-1563-1564-1565-1566-1567-1568-1569-1570-1571-1572-1573-1574-1575-1576-1577-1578-1579-1580-1581-1582-1583-1584-1585-1586-1587-1588-1589-1590-1591-1592-1593-1594-1595-1596-1597-1598-1599-1600-1601-1602-1603-1604-1605-1606-1607-1608-1609-1610-1611-1612-1613-1614-1615-1616-1617-1618-1619-1620-1621-1622-1623-1624-1625-1626-1627-1628-1629-1630-1631-1632-1633-1634-1635-1636-1637-1638-1639-1640-1641-1642-1643-1644-1645-1646-1647-1648-1649-1650-1651-1652-1653-1654-1655-1656-1657-1658-1659-1660-1661-1662-1663-1664-1665-1666-1667-1668-1669-1670-1671-1672-1673-1674-1675-1676-1677-1678-1679-1680-1681-1682-1683-1684-1685-1686-1687-1688-1689-1690-1691-1692-1693-1694-1695-1696-1697-1698-1699-1700-1701-1702-1703-1704-1705-1706-1707-1708-1709-1710-1711-1712-1713-1714-1715-1716-1717-1718-1719-1720-1721-1722-1723-1724-1725-1726-1727-1728-1729-1730-1731-1732-1733-1734-1735-1736-1737-1738-1739-1740-1741-1742-1743-1744-1745-1746-1747-1748-1749-1750-1751-1752-1753-1754-1755-1756-1757-1758-1759-1760-1761-1762-1763-1764-1765-1766-1767-1768-1769-1770-1771-1772-1773-1774-1775-1776-1777-1778-1779-1780-1781-1782-1783-1784-1785-1786-1787-1788-1789-1790-1791-1792-1793-1794-1795-1796-1797-1798-1799-1800-1801-1802-1803-1804-1805-1806-1807-1808-1809-1810-1811-1812-1813-1814-1815-1816-1817-1818-1819-1820-1821-1822-1823-1824-1825-1826-1827-1828-1829-1830-1831-1832-1833-1834-1835-1836-1837-1838-1839-1840-1841-1842-1843-1844-1845-1846-1847-1848-1849-1850-1851-1852-1853-1854-1855-1856-1857-1858-1859-1860-1861-1862-1863-1864-1865-1866-1867-1868-1869-1870-1871-1872-1873-1874-1875-1876-1877-1878-1879-1880-1881-1882-1883-1884-1885-1886-1887-1888-1889-1890-1891-1892-1893-1894-1895-1896-1897-1898-1899-1900-1901-1902-1903-1904-1905-1906-1907-1908-1909-1910-1911-1912-1913-1914-1915-1916-1917-1918-1919-1920-1921-1922-1923-1924-1925-1926-1927-1928-1929-1930-1931-1932-1933-1934-1935-1936-1937-1938-1939-1940-1941-1942-1943-1944-1945-1946-1947-1948-1949-1950-1951-1952-1953-1954-1955-1956-1957-1958-1959-1960-1961-1962-1963-1964-1965-1966-1967-1968-1969-1970-1971-1972-1973-1974-1975-1976-1977-1978-1979-1980-1981-1982-1983-1984-1985-1986-1987-1988-1989-1990-1991-1992-1993-1994-1995-1996-1997-1998-1999-2000-2001-2002-2003-2004-2005-2006-2007-2008-2009-2010-2011-2012-2013-2014-2015-2016-2017-2018-2019-2020-2021-2022-2023-2024-2025-2026-2027-2028-2029-2030-2031-2032-2033-2034-2035-2036-2037-2038-2039-2040-2041-2042-2043-2044-2045-2046-2047-2048-2049-2050-2051-2052-2053-2054-2055-2056-2057-2058-2059-2060-2061-2062-2063-2064-2065-2066-2067-2068-2069-2070-2071-2072-2073-2074-2075-2076-2077-2078-2079-2080-2081-2082-2083-2084-2085-2086-2087-2088-2089-2090-2091-2092-2093-2094-2095-2096-2097-2098-2099-2100-2101-2102-2103-2104-2105-2106-2107-2108-2109-2110-2111-2112-2113-2114-2115-2116-2117-2118-2119-2120-2121-2122-2123-2124-2125-2126-2127-2128-2129-2130-2131-2132-2133-2134-2135-2136-2137-2138-2139-2140-2141-2142-2143-2144-2145-2146-2147-2148-2149-2150-2151-2152-2153-2154-2155-2156-2157-2158-2159-2160-2161-2162-2163-2164-2165-2166-2167-2168-2169-2170-2171-2172-2173-2174-2175-2176-2177-2178-2179-2180-2181-2182-2183-2184-2185-2186-2187-2188-2189-2190-2191-2192-2193-2194-2195-2196-2197-2198-2199-2200-2201-2202-2203-2204-2205-2206-2207-2208-2209-2210-2211-2212-2213-2214-2215-2216-2217-2218-2219-2220-2221-2222-2223-2224-2225-2226-2227-2228-2229-2230-2231-2232-2233-2234-2235-2236-2237-2238-2239-2240-2241-2242-2243-2244-2245-2246-2247-2248-2249-2250-2251-2252-2253-2254-2255-2256-2257-2258-2259-2260-2261-2262-2263-2264-2265-2266-2267-2268-2269-2270-2271-2272-2273-2274-2275-2276-2277-2278-2279-2280-2281-2282-2283-2284-2285-2286-2287-2288-2289-2290-2291-2292-2293-2294-2295-2296-2297-2298-2299-2300-2301-2302-2303-2304-2305-2306-2307-2308-2309-2310-2311-2312-2313-2314-2315-2316-2317-2318-2319-2320-2321-2322-2323-2324-2325-2326-2327-2328-2329-2330-2331-2332-2333-2334-2335-2336-2337-2338-2339-2340-2341-2342-2343-2344-2345-2346-2347-2348-2349-2350-2351-2352-2353-2354-2355-2356-2357-2358-2359-2360-2361-2362-2363-2364-2365-2366-2367-2368-2369-2370-2371-2372-2373-2374-2375-2376-2377-2378-2379-2380-2381-2382-2383-2384-2385-2386-2387-2388-2389-2390-2391-2392-2393-2394-2395-2396-2397-2398-2399-2400-2401-2402-2403-2404-2405-2406-2407-2408-2409-2410-2411-2412-2413-2414-2415-2416-2417-2418-2419-2420-2421-2422-2423-2424-2425-2426-2427-2428-2429-2430-2431-2432-2433-2434-2435-2436-2437-2438-2439-2440-2441-2442-2443-2444-2445-2446-2447-2448-2449-2450-2451-2452-2453-2454-2455-2456-2457-2458-2459-2460-2461-2462-2463-2464-2465-2466-2467-2468-2469-2470-2471-2472-2473-2474-2475-2476-2477-2478-2479-2480-2481-2482-2483-2484-2485-2486-2487-2488-2489-2490-2491-2492-2493-2494-2495-2496-2497-2498-2499-2500-2501-2502-2503-2504-2505-2506-2507-2508-2509-2510-2511-2512-2513-2514-2515-2516-2517-2518-2519-2520-2521-2522-2523-2524-2525-2526-2527-2528-2529-2530-2531-2532-2533-2534-2535-2536-2537-2538-2539-2540-2541-2542-2543-2544-2545-2546-2547-2548-2549-2550-2551-2552-2553-2554-2555-2556-2557-2558-2559-2560-2561-2562-2563-2564-2565-2566-2567-2568-2569-2570-2571-2572-2573-2574-2575-2576-2577-2578-2579-2580-2581-2582-2583-2584-2585-2586-2587-2588-2589-2590-2591-2592-2593-2594-2595-2596-2597-2598-2599-2600-2601-2602-2603-2604-2605-2606-2607-2608-2609-2610-2611-2612-2613-2614-2615-2616-2617-2618-2619-2620-2621-2622-2623-2624-2625-2626-2627-2628-2629-2630-2631-2632-2633-2634-2635-2636-2637-2638-2639-2640-2641-2642-2643-2644-2645-2646-

8

Synthesis of 10-alkyl derivatives of 9-methyl-1,2-benzanthracene. --B. M. Mikhailov and N. G. Chetnova (Compt. rend. acad. sci. U. R. S. S. 20, 570-81, 1969; in English) -- Cyclization of 12 g. 2-(1-C<sub>10</sub>H<sub>7</sub>CH<sub>2</sub>Me)C<sub>10</sub>H<sub>7</sub> by heating with 35 g. anhyd. ZnCl<sub>2</sub> at 100° for 1 hr gave 70% 9-methyl-1,2-benzanthracene, m. 105-106° (m. 104.4-7.2°, recrystd. from Me<sub>2</sub>CO). Treatment of the latter with appropriate RMgX compounds gave the following 1,2-benzanthracene derivs.: 9,10-dimethyl, yellow, m. 122-3° (cf. Bachmann and Chemersla, C. A. 32, 4978; and Newman, C. A. 33, 4978); m. 101°; yield (monoprecipitate, black, m. 112-2-132°) 9-methyl-10-ethyl-

yellow, m. 107-15°; by decoupling of the diprecipitate, m. 110-10°; 9-methyl-10-propyl, light green, m. 99-101°; by decoupling of the diprecipitate, red, m. 94-95°; 9-methyl-10-butyl, light yellow, m. 71-2-80°; yield by decoupling of the diprecipitate, red, m. 101-105°.

John F. Long

CA

synthesis of polycyclic compounds I 1',2',3',4'  
Tetrahydro-1,2-benzanthracen-9-one. N. G. Chernova  
and B. M. Mikhailov. J. Gen. Chem. (U. S. S. R.) 9,  
2168-70 (1939).—Cyclization of *o*-(6-tetrahyli)methylben-  
zoic acid (I) was studied by heating 45 min. 10 g. I and 30  
g. of powd. anhyd.  $ZnCl_2$  in an oil bath at 180°, decomp.  
the mixt. with dil. HCl and extg. with  $CHCl_3$ . After the  
removal of unreacted I with  $Na_2CO_3$  soln. and the  $CHCl_3$   
by evapn., the residue was recrystd. from  $C_6H_6$ , giving  
9-methyl-1,2-benzanthracen-9-one, m. 142.5° (142°, Braun,  
et al., C. A. 22, 1586). Concn. of the mother liquor  
yielded 7% 1',2',3',4'-tetrahydro-1,2-benzanthracen-9-one  
(II), m. 100-9.7°. Grignard reaction of 0.5 g. II in 25  
ml.  $C_6H_6$  and  $MeMgI$  (from 0.5 g. Mg, 3 g.  $MeI$  and 25  
ml. ether) gave 48% 9-methyl-1',2',3',4'-tetrahydro-1,2-  
benzanthracene, m. 122.6-4.2°; picrate, m. 126.5-6.2°  
II. The Reformatski reaction with 9-methyl-1,2-ben-  
zanthracen-10-one. B. M. Mikhailov and N. G. Cher-  
nova. Ibid. 2171-2.—A mixt. of 12 g. of 9-methyl-1,2-  
benzanthracen-10-one, 10.3 ml.  $BrCH_2CO_2Et$  and 6.9 g.  
Cu-Zn in 40 ml. of dry  $C_6H_6$  was heated until the violent  
reaction had begun and the source of heat was removed.  
The reaction mixt. was then refluxed on a water bath for  
7 hrs. and decompd. with ice water and dil. HCl. Evapn.  
of the  $C_6H_6$  and recrystn. of the residue from alc. yielded  
44% of *Et* 9-methyl-1,2-benzanthr-10-yl acetate, m. 81.6-  
3°. The acetate, m.pond. with 10% KOH in alc., gave the  
free acid; amide, m. 270-2° (decompn.). The acid on  
heating at 200° or at 180° with the addn. of  $ZnCl_2$  spln  
 $CO_2$  and gave 9,10-dimethyl-1,2-benzanthracene, m. 121  
2.4°.  
Chas. Blanc

| 117 AND 118 SERIES                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |  | 119 AND 120 SERIES                                                                          |  |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|---------------------------------------------------------------------------------------------|--|
| SYNTHESIS AND PROPERTIES                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |  | SYNTHESIS AND PROPERTIES                                                                    |  |
| <p><i>Be</i></p> <p><i>a-3</i></p> <p>Synthesis of polycyclic compounds... II. Re-<br/>arranging reaction with 2-methyl-4:2-benz-<br/>anthracene-6:8. R. T. MICHANOV and N. G. TUCHEN-<br/>KOVA. (J. Gen. Chem. USSR, 1971, 41, 2171-2173).<br/>2-Methyl-1:2-benzanthracene-6:8, 2:10-<br/>Zn-O in <math>C_2H_4</math> yield 2-methyl-1:2-benzanthracene-6:8<br/>acid, m.p. 210-211° (decolor.) [21 ester, m.p.<br/>214-215°; amide, m.p. 219-220° (decolor.)], con-<br/>verted into 2:10-benzanthracene-1:2-benzanthracene by<br/>heating at the st. p., or with <math>SnCl_4</math>. R. T.</p> |  | <p>COMMON ELEMENTS</p> <p>COMMON ELEMENTS</p> <p>COMMON ELEMENTS</p> <p>COMMON ELEMENTS</p> |  |
| <p>450.514 METALLURGICAL LITERATURE CLASSIFICATION</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |  | <p>COMMON ELEMENTS</p>                                                                      |  |
| <p>COMMON ELEMENTS</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |  | <p>COMMON ELEMENTS</p>                                                                      |  |

| 1st and 2nd copies                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |  | 3rd and 4th copies |  |
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| PROCESSING AND REPRODUCTION INDEX                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |  |                    |  |
| <p><b>Synthesis of polycyclic compounds. IV. 9-Ethyl-10-methyl-1,2-benzanthracene and 9-ethyl-1,2-benzanthracene.</b> B. M. Mikhailov and A. N. Blokhina. <i>J. Gen. Chem.</i> (U. S. S. R.) 10, 1793-7 (1940). - In a study of carcinogenic compds. 9-ethyl- (I) and 9-ethyl-10-methyl-1,2-benzanthracene (II) were prepd. as follows: 2-(1-Naphthyl)benzoic acid (28 g.), in 300 ml. abs. Et<sub>2</sub>O and 420 ml. benzene, treated with EtMgBr (from 63.2 g. EtBr), decompd. in the usual manner, boiled with dil. HCl and let stand overnight, yields a mixt. of lactones of 2-(1-hydroxy-1-(1-naphthyl)propyl)benzoic acid (III) and of 2-(hydroxy-1-naphthylmethyl)benzoic acid (IV). The Et<sub>2</sub>O benzene soln. of the mixt., shaken out with Na<sub>2</sub>CO<sub>3</sub> and pptd. by petr. ether, yields 22.5% III, m. 162-4°, and the mother liquor from III yields IV, m. 137-8° (from benzene, EtOH). III (10 g.) in 180 ml. AcOH, boiled with 50 g. Zn-Hg with gradual addn. of 180 ml. concd. HCl-60 ml. AcOH, dild. with H<sub>2</sub>O, extd. with Et<sub>2</sub>O, the latter extd. with Na<sub>2</sub>CO<sub>3</sub> and the ext. acidified, yields 73.3% 2-(1-(1-naphthyl)propyl)benzoic acid (V), m. 149.5-50° (from benzene). V (5.5 g.) and 28 ml. SnCl<sub>4</sub>, heated 1 hr. on a steam bath, dissolved in Me<sub>2</sub>CO, dild. with benzene, treated with dil. HCl, the benzene soln. extd. with 10% Na<sub>2</sub>CO<sub>3</sub>, then evapd., yield 80% 9-ethyl-1,2-benzanthracene (VI), m. 92-92.8° (from Me<sub>2</sub>CO). VI (0.5 g., 2.5 g. Zn dust (activated by CuSO<sub>4</sub> soln.) and 6 ml. MePh, boiled for 21 hrs. with 40 ml. 10% NaOH, followed by distn. of the MePh in vacuo, yield 81.8% 9-ethyl-9,10-dihydro-1,2-benzanthracene-10-ol (VII), m. 94.5-5.5° (from benzene). VII (0.32 g. in benzene, shaken with 10% HCl, followed by distn. of the benzene, yields 83% I, m. 107-4-8.4° (from EtOH). monoperate, red, m. 111-13°, diplicate, red, m. 124-5°. VI (1 g. in 40 ml. benzene, added to MeMgI (from 6 g. MeI, let stand 24 hrs., decompd. by ac. HCl, followed by removal of the solvents, yields 81% II, m. 76-77° (from EtOH). diplicate, red, m. 124-5°. VI (0.5 g. in 20 ml. benzene, added to EtMgBr (from 2 g. EtBr) and refluxed 4 hrs., let stand overnight, then decompd. as usual, the solvents removed and the residue taken up in benzene and passed over Al<sub>2</sub>O<sub>3</sub>, yields 9,10-dihydro-1,2-benzanthracene, m. 98.5-9.5° (from Me<sub>2</sub>CO). EtOH. Cf. C. A. 34, 10080. G. M. Kowalski.</p> |  |                    |  |
| ASD 1.4 METALLURGICAL LITERATURE CLASSIFICATION                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |  |                    |  |



MIKHAILOV, B. M.

"Syntheses of polycyclic compounds. V. 4', 5-ace-3, 4-benzopyrene." Mikhailov, B. M.,  
and Chernova, N. G. (p. 282)

SO: Journal of General Chemistry (Zhurnal Obshchei Khimii) 1942, Vol 12, No 5-6.

[illegible]

MIKHAILOV, B. M.

"Syntheses of polycyclic compounds. VII. On 7, 10-dephenyl - 1', 2', 3', 4' - tetrahydro-1,2-benzanthracene." Mikhailov, B. M., and Chernova, V. G. (p. 215)

SO: Journal of General Chemistry (Zhurnal Obshchei Khimii) 1942, Vol 12, No 5-6.

MIKHAILOV, P. M.

"Synthesis of polycyclic compounds. 1,4,5-ace-3,4-benzopyrene." Mikhailov, E. M., and Chernova, N. G. (p. 531)

SO: Journal of General Chemistry (Zhurnal Obshchei Khimii) 1942, Vol 12, No 7-10.

| 137 AND 138 (2)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |  | 139 AND 140 (2) |  |
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| PROCESS AND PROPERTIES INDEX                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |  |                 |  |
| <p><i>Ca</i></p> <p>Synthesis of polycyclic compounds. VIII. 10-Alkyl derivatives of 3,6'-<i>acc</i>-1,3-benzanthracene. B. M. Mikhal'ko and A. N. Bikhina. <i>J. Gen. Chem.</i> (U. S. S. R.) 33, 1515-1516 (1963) (English summary); cf. C. A. 57, 3443. — 2-(3-Acetylphenylmethyl)benzoic acid (10 g.) in 100 cc. warm AcOH were treated with 10 cc. AcOH and 1.4 g. ZnCl<sub>2</sub>, refluxed for 20 min. and cooled to yield 95% 3,6'-<i>acc</i>-1,3-benzanthryl 10-acetate, m. 223-4° (from AcOH). The numbering used is shown in A. The above (5.5 g.) in 250 cc. dry benzene was added to BuMgBr (from 9 g. BuBr), refluxed for 2 hrs. and decomp. with ice and NH<sub>4</sub>Cl soln. to yield 90% crude 3,6'-<i>acc</i>-1,3-benzanthracen-10-ol (I), which yields 3,6'-<i>acc</i>-1,3-benzanthraquinone, m. 221-2° (from AcOH), on oxidation with dichromate. The benzene soln. of I (3 g.), after refluxing for 1 hr., yielded on evapn. a mixt. of the starting material and its isomer, <i>ac</i>benzanthrone; the mixt. (II) m. 170-80°. II (1 g.) in benzene was reacted with HCl (from 9 g. MeI), refluxed for 4 hrs. and decomposed in the usual manner, to yield, after passage in benzene-pet. ether soln. over activated alumina, 30% 10-methyl-3,6'-<i>acc</i>-1,3-benzanthracene, m. 181.7-82.5° (from benzene-EtOH); <i>picrate</i>, m. 191-2° (from benzene). II (0.5 g.) was reacted with EtMgBr (from 2.4 g. EtBr) to yield, after similar chromatographic treatment, 55.6% 10-ethyl-3,6'-<i>acc</i>-1,3-benzanthracene, m. 174.5-5° (from benzene-pet. ether); <i>picrate</i>, m. 150-5° (decomp.). II (0.1 g.) and PrMgBr (from 2 g. PrBr) similarly gave 25% of 10-propyl-3,6'-<i>acc</i>-1,3-benzanthracene, m. 145-4° (from benzene-EtOH); <i>picrate</i>, m. 105.5-0.5° (from EtOH). II (0.5 g.) and BuMgBr (from 2.5 g. BuBr) yielded 30.7% 10-butyl-3,6'-<i>acc</i>-1,3-benzanthracene, m. 128-0° (from benzene-EtOH); <i>picrate</i>, m. 141-2° (from EtOH).<br/>G. M. Kosolapoff</p> |  |                 |  |
| <p>(A)</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |  |                 |  |
| <p>ASB-514 METALLURGICAL LITERATURE CLASSIFICATION</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |  |                 |  |

157 AND 158 (1951) PROCESSED AND PROPERTIES INDEX 159 AND 160 (1951)

23

**Synthesis of polyaromatic compounds. IX. Reaction between stable free radicals and multi-substituted aromatic hydrocarbons. Addition of triphenylmethyl to 9:10-dimethylantracene.** R. M. Michailov (Bull. Acad. Sci. U.S.S.R., Chem., 1948, 637-639).—CPh<sub>3</sub> adds to the 9:10-positions of 9:10-dimethylantracene. The reaction is explained on the basis of the quantum-chemical theory of stability and reactivity of free radicals.

9:10-Dimethylantracene in C<sub>6</sub>H<sub>6</sub> is shaken with CPh<sub>3</sub>Cl and Hg for 16 hr. at room temp., and then for 30 hr. at 100°, to give 9:10-di(triphenylmethyl)-9:10-dihydroanthracene, C<sub>24</sub>H<sub>20</sub>, m.p. 184-193°

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COMMON ELEMENTS

MATERIALS INDEX

ASAC-36A METALLURGICAL LITERATURE CLASSIFICATION

159 AND 160 (1951)

159 AND 160 (1951)

MIKHAYLOV, B. M.

Synthesis of polycyclic compounds. X. Mechanism of Wurtz reaction in the bimetallic derivatives of anthracene and 1,2-benzanthracene. B. M. Mikhailov. *Izv. Akad. Nauk S.S.S.R., Otdel. Khim. Nauk* 1946, 610-32; cf. *C.A.* 40, 4712.

The formation of the metal derivs. was done as follows: the hydrocarbon in a 1:1 mixt. of pure  $C_6H_6$  and  $Et_2O$  and a quantity of glass beads were charged into the flask in a N atm. and treated with sliced metal; the closed flask was shaken 50-100 hrs., then a Y-tube was attached, through 1 leg of which RX was added with cooling, while the 2nd leg was connected to a gasometer. After standing 0.5 hr. the unreacted metal was removed and the products worked up. Anthracene (20 g.), 6 g. Na, 150 ml.  $C_6H_6$ ,  $Et_2O$ , and an equiv. amt. of MeI gave 7.4 g. anthracene, 1.3 l. gases (63%  $C_6H_6$ , 31%  $C_6H_4$ , and 6%  $C_6H_2$ ), and 3.8 g. cryst. products, m. 98-102.6°, from which 0.18 g. 9,10-dimethyl-9,10-dihydroanthracene, m. 130-1° (from  $EtOAc$ ), was obtained; the mother liquor from this was evapd. and the residue dehydrogenated with S at 210-20°; treatment with picric acid gave some 9,10-dimethylanthracene picrate, m. 172-1°, while chromatographing the mother liquor from this on  $Al_2O_3$ , followed by treatment with alk., gave 9-methylanthracene picrate, m. 170-10°, which gave the free hydrocarbon, m. 71-80° (from dil.  $HCl$ ). Heating 9,10-dimethyl-9,10-dihydroanthracene with S 20 min. to 195-200° gave 80% 9,10-dimethylanthracene, m. 181.5-181.5° (from  $C_6H_6$ ). The reaction performed as above but

using 11 g. MeCl, gave 1% anthracene and 70% mixed 9,10-dimethyl-9,10-dihydroanthracene and 9-methyl-9,10-dihydroanthracene; the mixt. evolved 100 ml. gases (10%  $C_6H_6$  and 81%  $C_6H_4$ ). 1,2-benzanthracene (10 g.), 2.3 g. Na, 150 ml.  $C_6H_6$ - $Et_2O$ , and 5 g. MeCl gave 0.1 g. 1,2-benzanthracene, after the sepn. of which the remaining material was dehydrogenated by heating with S and treated with picric acid, giv<sup>g</sup> a picrate, m. 171.5-171.5°, which gave 1.4 g. free 10-methyl-1,2-benzanthracene, m. 140-1°; the mother liquors gave some 9,10-dimethyl-1,2-benzanthracene, m. 122-3°, 30 ml. of gas was collected (31%  $C_6H_6$ , 66%  $C_6H_4$ ,  $C_6H_2$ ). Anthracene (10 g.), 2 g.  $Li$ , and an equiv. of MeI gave 30 ml. mixed  $C_6H_6$ ,  $C_6H_4$ , and  $C_6H_2$ , 3.1 g. anthracene, and 31% mixed crude dihydroderivs.; dehydrogenation of these by S resulted in isolation of 9,10-dimethyl- and 9-methylanthracenes. Anthracene (20 g.), 4 g.  $Li$ , and 13 g. MeCl gave after evapn. of the solvent 20.2 g. cryst. solid, m. 65-105°, which after dehydrogenation with S 1.5 hrs. at 210-20°, followed by heating with a little Cu 10 min. at 220-20°, gave 15.6 g. 9,10-dimethylanthracene, m. 182-1.5° (from  $C_6H_6$ ), with an addnl. amt. from the mother liquor (total yield 92.8%). The pure substance, m. 181.5-1.5°, long yellow needles. In a duplicate expt. the reaction product was directly cryd. from  $EtOAc$ - $C_6H_6$  and gave 4.8 g. anthracene (1.8 g. 9,10-dimethyl-9,10-dihydroanthracene, m. 140-1°), while chromatography of the liquor on  $Al_2O_3$  gave some 1-methylanthracene of the same hydrocarbon, m. 181.5°. Addn. of MeOH to the

[illegible]



MIKHAYLOV, B. M. Dr. Chem. Sci.

Dissertation: "Investigation in the field of Anthracene and 1, 2-Benzanthracene." Inst of Organic Chemistry, Acad Sci USSR, 12 Jun 47.

SO: Vecnernyaya Moskva, Jun, 1947 (Project #17836)

*Synthesis of polycyclic compounds. XIII. Platinum-organic compounds of anthracene.* E. M. Mikhailov. *Izv. Akad. Nauk S.S.S.R., Otdel. Khim. Nauk (Bull. Acad. Sci. U.R.S.S., Classe sci. chim.)* 1948, 420-6; *J. C.S.* 47, 6350H. Reaction of Li with 9,10-dibromoanthracene (I) leads to the exchange of 1-Br for Li when 1 atom of Li is used; while both Br atoms are exchanged when 2 atoms of Li are used. 9-Bromoanthracene (II) (0.5 g.) in 10 ml. dry Et<sub>2</sub>O, treated in a N atm. with 0.1 g. Li in thin slices, shaken periodically 1 hr. at 40° in a sealed flask, cooled, poured on powd. Dry Ice, and the aq. layer acidified, gave only a trace of 9-anthracenecarboxylic acid (III), while 40% anthracene was recovered from a benzene ext. BuLi (from 0.48 g. BuCl and 0.1 g. Li in 10 ml. Et<sub>2</sub>O) treated in a N atm. with 0.9 g. II, shaken 5 min. at room temp., poured on solid CO<sub>2</sub>, extd. with Et<sub>2</sub>O, and the aq. layer acidified gave 77% III, m. 214-16° (from dil. EtOH); the Et<sub>2</sub>O layer gave 3.2% anthracene. Repetition of the exp. but keeping the mixt. 15 min. at 40° gave 68% III and 13% anthracene. BuLi (from 0.96 g. BuCl and 0.16 g. Li in 20 ml. ice-cold Et<sub>2</sub>O) shaken 5 min. at room temp. with 1.9 g. II, then treated with about 1 g. ethylene oxide (gas), followed by decompn. with H<sub>2</sub>O, gave in the Et<sub>2</sub>O layer 84.5% 9-(2-hydroxyethyl)anthracene, yellow needles, m. 100.5-7.5° (from dil. EtOH).

Shaking 2 g. I, 0.1 g. Li, and 20 ml. Et<sub>2</sub>O 20 hrs. at 60-60° in a sealed flask, followed by treatment with solid CO<sub>2</sub>, gave 0.14 g. 9-bromo-10-anthracenecarboxylic acid, m. 205-7° (from EtOH), and 0.1 g. original I. Addn. of 2.6 g. I to BuLi (from 0.96 g. BuCl and 0.16 g. Li in 20 ml. Et<sub>2</sub>O), followed by heating in a sealed flask 30 min. at 40° and treatment with CO<sub>2</sub>, gave 80.3% of the above acid; when the heating was extended to 2 hrs. the yield dropped to 37.2%, while shaking 5 min. at room temp. gave 58% of the acid and 0.36 g. I. Addn. of 1.9 g. I to 0.0076 mole BuLi in Et<sub>2</sub>O, followed by shaking 15 min. at room temp., gave, on carboxylation as above, 0.34 g. 9,10-anthracenedicarboxylic acid, decomp. 330-40° (from dil. EtOH). BuLi (from 1.9 g. BuCl and 0.3 g. Li in 20 ml. Et<sub>2</sub>O), dild. with 20 ml. Et<sub>2</sub>O, then treated over 2-3 min. with stirring and cooling with 4.5 g. powd. I, stirred 15 min., treated with cooling with Et<sub>2</sub>O-McOH, stirred with H<sub>2</sub>O, and the org. layer concd., yielded 43.6% II, m. 97-9° (from EtOH). BuLi (from 0.05 g. BuCl and 0.16 g. Li in 25 ml. cold Et<sub>2</sub>O) and 2.6 g. I, shaken in a N stream 15 min. at room temp., then treated with 0.6 g. gaseous ethylene oxide, decompd. with water, and extd. with Et<sub>2</sub>O, gave 64% 9-bromo-10-(2-hydroxyethyl)anthracene, decomp. 147.5-8° (from Et<sub>2</sub>O), yellow needles.

G. M. Kiselev

MIKHAYLOV, B. M.

PA 8/49T16

USSR/Chemistry - Cyclic Compounds  
Chemistry - Synthesis  
Jul/Aug 48

"Synthesis of Polyyclic Compounds," B. M. Mikhaylov, Inst Org Chem, Acad Sci USSR, 64 pp

"Iz Ak Nauk SSSR, Otdel Khim Nauk" No 4

Studies action of lithium and n-butyl-lithide (I) on meso-bromo derivatives of anthracene. Establishes that when lithium reacts with 9, 10-dibromanthracene (II), one halogen atom is replaced by metal. When one equivalent of I reacts with 9-bromo and II, 9-anthryl lithide and 9-bromo-10-anthryl lithide are formed. These can be used in synthesis. When two equivalents of I react with II, 8/49T16

USSR/Chemistry - Cyclic Compounds (Contd) Jul/Aug 48  
two halogen atoms are replaced by metal. Submitted  
6 Nov 1946.

8/49T16

MIKHAILOV, B. M.

Synthesis of polycyclic compounds. New preparation of homologs of 1,2 benzantracene. B. M. Mikhailov and T. K. Kozmmskaya. Doklady . 1 kad. Nauk S.S.S.R. 59, 509-11 (1948); cf. C. A. 42, 63501. Li (0.05 g.), 0.25 g. BuCl, and 7ml. abs. Et<sub>2</sub>O are shaken 2 hrs. in a Schlenk flask filled with N<sub>2</sub>, the BuLi soln, under N treated with 0.5 g. 10-bromo-1,2-benzanthracene in dry pure C<sub>6</sub>H<sub>6</sub>, shaken 7-10 min., poured on Dry Ice, and treated with water, giving 60% 1,2 benzantracene-10-carboxylic acid, m. 218-20°; the neutral products contain 23% 1,2 benzantracene. If in the above expt. the mixt. is treated with an excess of MeI in Et<sub>2</sub>O instead of CO<sub>2</sub> and heated 2 hrs. at 40° in a closed flask, treatment with water and evapn. give 20% 10-methyl-1,2-benzathracene, m. 140-10 (from benzene-alc.) . EtI instead of MeI similarly gave 47.5% 10-ethyl-1,2-benzanthracene, m. 113.5-14° (from EtOH).

G. M. Kosolapoff

MS

MIKHAYLOV, B. M.

FA 43/49T11

USSR/Chemistry - Cyclic Compounds Mar/Apr 49  
Chemistry - Alkali Metals

"Syntheses of Polycyclic Compounds," B. M. Mikha-  
lov, A. N. Blokhina, Inst of Org Chem, Acad Sci  
USSR, 14 pp

"Iz Ak Nauk SSSR, Otdel Khim Nauk" No 2

Investigates reaction between sodium and lithium  
addition products with anthracene and 1, 2-benz-  
anthracene and alkyl halides. Discovers effects of  
(1) nature of alkali metal, (2) nature of halide,  
and (3) magnitude of hydrocarbon radical in alkyl  
halide on course of process. Establishes that  
43/49T11

USSR/Chemistry - Cyclic Compounds Mar/Apr 49  
(Contd)

reaction between lithium compounds of multinuclear  
hydrocarbons and alkyl chlorides is a preparative  
method of obtaining mesomologues of anthracene,  
1, 2-benzanthracene and their 9, 10-dihydro deriva-  
tives. Submitted 7 Apr 48.

43/49T11

MIKHAYLOV, B. M.

PA50/49T12

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USSR/Chemistry - Anthracene  
Chemistry - Synthesis

May/Jun 49

"Synthesis of Polycyclic Compounds: IV, Metalizing 9, 10-Dihydroanthracene and 9, 10-Dihydro-1, 2-Benzanthracene," B. M. Mikhaylov, A. N. Blokhina, Inst of Org Chem, Acad Sci USSR, 7½ pp

"Iz Ak Nauk SSSR, Otdel Khim Nauk" No 3

Studies the reaction of metalizing these substances, with n-butyllithium and phenyllithium, showing products to be monometallic and dimetallic hydrocarbon derivatives. These reactions have application in the synthesis of single-displaced derivatives of 9, 10-dihydroanthracene. Submitted 7 Apr 49.

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56/49T12

[illegible]

dihydroanthracene. The di-Na deriv. from 1 g. 1 with 1 g.  $\text{CH}_3\text{COCl}$  gave 0.24 g. 11 and 0.9 g. 12 with 1 g.  $\text{CH}_3\text{COCl}$  gave 0.24 g. 11 and 0.9 g. 12. Ethyl 2,10-dihydrophenanthrene, m. 140-141° from  $\text{Me}_2\text{CO}$  (solution with  $\text{CaH}_2$ ). Passage of ethylene oxide into a suspension of the di-Na deriv. (from 1 g. 1) and standing 3 hrs. gave, upon treatment with  $\text{H}_2\text{O}$ , 11 and 12. Photographing (solution with  $\text{CaH}_2$ , 140°), after ligand addition, 0.10 g. 12; 0.10 g. 11. Yield 0.10 g. 11, 0.10 g. 12. From di- $\text{Me}_2\text{CO}$ . Yield 0.10 g. 11, 0.10 g. 12. 1 g. 1 gave a green

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CA

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**Action of phosphorus pentachloride and pentabromide on anthracene and its derivatives.** B. M. Mikhailov and M. Sh. Prumyslov (Inst. Gen. and Exptl. Pathol., Acad. Med. Sci. U.S.S.R.) *Zhur. Obshch. Khim.* (J. Gen. Chem.) 20, 338-45 (1950). — The reaction of anthracene with  $\text{PCl}_5$  probably proceeds by addn. of atomic Cl and  $\text{PCl}_5$  across the meso positions and the product then splits off  $\text{PCl}_5$  and  $\text{HCl}$ . Refluxing 2 g. anthracene, 2.8 g.  $\text{PCl}_5$ , and 25 ml. dry  $\text{C}_6\text{H}_6$  1 hr. gave 0.6 g. 9-chloroanthracene, m. 104-6°, on cooling and 1 g. addnl. on evapn. for 100% yield, with 0.47 g. recovered anthracene, a doubled amt. of  $\text{PCl}_5$  gave after 100 hrs. at room temp. 0.35 g. 9,10-dichloroanthracene, m. 208-10°, and 1.4 g. 9-Cl deriv. Heating the 9-Cl deriv. with  $\text{PCl}_5$  in  $\text{C}_6\text{H}_6$  3 hrs. gave 51.7% of the 9,10-di-Cl deriv., while standing 6 days at room temp. gave 34.4%. Heating 9-bromoanthracene with  $\text{PCl}_5$  in  $\text{C}_6\text{H}_6$  3 hrs. gave 35.5% 9-chloro-10-bromoanthracene, m. 218-10° (from  $\text{C}_6\text{H}_6$ ), m. 210.5-11° (on repeated crystals). Keeping 9-methylanthracene similarly with  $\text{PCl}_5$  10 hrs. in  $\text{C}_6\text{H}_6$  gave 20% 9-methyl-10-chloroanthracene, m. 170-80° (from EtOH). Addn. of 5.07 g.  $\text{PBr}_5$  to 2 g. anthracene in  $\text{C}_6\text{H}_6$  gave a milky gradually depositing the dibromide, which vanished in 30 min., and evapn. after washing gave 95.4% 9-bromoanthracene, m. 100-1° (from EtOH), interruption of the reaction after 10 min. gave 9,10-dibromo-9,10-dichloroanthracene, m. 94-7°. Similar reaction of 9-chloroanthracene, while 9-bromoanthracene in 24 hrs. gave 84.6% 9,10-dibromoanthracene, m. 218-20°. 9-Methylanthracene in a similar reaction in 10 min. gave 42.5% 9-methyl-10-bromoanthracene, m. 170-3°. Hence, the  $\text{PBr}_5$  reactions go via the  $\text{PBr}_4$  Br<sub>2</sub> route. G. M. Komolov



CA

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**Preparation of acenaphthylene** B. M. Mikhailov and  
A. N. Blukhina, *Zhur. Obshch. Khim.* **20**  
1810 (1950). Contrary to Firmanov et al. (17, 18),  
passage of naphthalene over PtO<sub>2</sub> at 400°C. produces no  
significant conversion to acenaphthylene. The latter can  
be obtained in 30% yield, however, at 640°C.; the product, on re-  
crystallization, is freed from starting material by  
recrystallization of the mixed picrates from CCl<sub>4</sub>. G. M. K.

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CA

Structure of organic compounds of alkali metals. The complex nature of the lithium organic compound of tetraphenylethylene. B. M. Mikhailov and N. G. Chernova. *Doklady Akad. Nauk S.S.S.R.* 70, 237-9 (1950). — Since many metalloorg. compds. contg. 2 alkali-metal atoms exist in colorless or colored forms, depending upon the presence or absence of polar solvents like  $\text{Et}_2\text{O}$  in the medium, the possibility of  $\text{Et}_2\text{O}$  actually taking part in the formation of colored forms was investigated. Shaking 0.5 g  $\text{Ph}_2\text{C}:\text{CPh}_2$  and 0.05 g sliced Li in 60-75 ml. dry  $\text{Et}_2\text{O}$  in a N-filled sealed tube over 90 hrs. and mech. removal of the red product, drying *in vacuo* to essentially constant wt., and treatment with  $\text{Et}_2\text{O}:\text{MeOH}$  gave 1,1,2,2-tetraphenylethane, m.  $205-8^\circ$ , the wt. difference between the latter and the red complex, with allowance for the Li content (obtained by titration of the aq. layer) gave the compn. of the complex as a combination of 1 mol. hydrocarbon, 2 atoms Li, and 1 mol.  $\text{Et}_2\text{O}$ , possibly formed by a doubly neg. ion of  $(\text{Ph}_2\text{C})_2$  and a doubly pos. ion of  $\text{Li}_2\text{OEt}_2$ . It is suggested that  $\text{Et}_2\text{O}$  may form an integral part of many other alkali-metal complexes and substances like  $\text{Ph}_2\text{CNa}$ , when prepd. in  $\text{Et}_2\text{O}$  solns. It is believed that all alkali-metal org. compds. are of 2 types: those with a C—M bond of essentially covalent type with partly ionic character, and those which are colored and have a true complex ionic structure; class I covers metal-alkyls and metalaryls which are nonconductors in  $\text{Et}_2\text{O}$  soln. G. M. Kozolapoff

1951

CA

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Synthesis of phosphoorganic aromatic compounds with lithium reagents. B. M. Mikhailov and N. P. Kucherova *Doklady Akad. Nauk S.S.S.R.* 74, 501-4 (1950). Anthracene does not react with  $\text{PCl}_5$  in the presence of  $\text{AlCl}_3$ , while  $\text{PCl}_5$  leads only to Cl derivs. Aryl Li derivs with P halides in  $\text{Et}_2\text{O}$  readily gave P derivs. Thus 3  $\text{PhLi}$  and  $\text{PCl}_5$  gave 61%  $\text{Ph}_3\text{P}$ ; 1- $\text{C}_6\text{H}_5\text{Li}$  gave 27%  $(1-\text{C}_6\text{H}_5)_3\text{P}$ , m. 278-80°, while 9-phenanthryllithium gave 72% *tri*-9-phenanthrylphosphine, m. 374-6° (from  $\text{MePh}$ ); 9-anthryllithium gave phosphine, m. 270-3°, while 9-bromo-10-anthryllithium gave yellow *tri*(9-bromo-10-anthryl)phosphine, m. 206-8° (from  $\text{MePh}$ ). Similarly, the Li deriv. from 10-bromo-1,2-benzanthracene gave 54.6% *tri*-deriv. from 10-bromo-1,2-benzanthracene gave 54.6%  $\text{POCl}_3$  (1,2-benzanthr-10-yl)phosphine, yellow, m. 192-4°.  $\text{POCl}_3$  in  $\text{Et}_2\text{O}$  similarly gave 65%  $\text{Ph}_3\text{PO}$ , 38%  $(1-\text{C}_6\text{H}_5)_3\text{PO}$ , 49% *tri*-9-phenanthrylphosphine oxide, m. 354-6°, 65% *tri*-(1,2-benzanthr-10-yl)phosphine oxide, m. 191-3° (from  $\text{Et}_2\text{O}$ -benzene); alteration of the proportions of the reagents failed to yield products other than  $\text{R}_3\text{P}$ . Use of  $\text{C}_6\text{H}_5\text{NPOCl}_2$ , followed by hydrolysis, gave 64%  $\text{Ph}_3\text{PO}$ , m. 192-4°, 1%  $(1-\text{C}_6\text{H}_5)_3\text{PO}$ , m. 188-201°; 9-phenanthryllithium (2 moles/mole chloride) gave 2 acids. 9-phenanthrylphosphonic acid, m. 228-9°, and di-9-phenanthrylphosphonic acid, giving insol. Na salt, in 33% and 47% yield, resp. G. M. Kosolapoff

1937

CA

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The complex nature of the colored organic compounds of alkali metals. B. M. Mikhailov and N. G. Chernova (Acad. Med. Sci. USSR, Moscow) Doklady Akad. Nauk S.S.S.R. 74, 819 (2 1974). By complete elementary analysis,  $\text{Ph}_2\text{CNa}$  in soln. in  $\text{Et}_2\text{O}$  actually forms a complex of the compn.  $\text{Ph}_2\text{CNa} \cdot \text{E}$  and the structure  $[\text{Ph}_2\text{C}]^-$ .

$[\text{Na} \cdot \text{OEt}]^+$ ; failure by Schlenk and Markus (C.A. 8, 2728) to detect that complex was due to incomplete analysis. The corresponding Li complex has the compn.  $\text{Ph}_2\text{CLi} \cdot 2\text{E}$  and the structure  $[\text{Ph}_2\text{C}]^- [\text{Et}_2\text{O} \cdot \text{Li} \cdot \text{OEt}]^+$ . Further complexes in  $\text{Et}_2\text{O}$  soln. are:  $\text{Ph}_2\text{C} \cdot \text{CPh}_3 \cdot 2\text{Na} \cdot 2\text{E}$ ,  $\text{PhCH} \cdot \text{CPh}_3 \cdot 2\text{Na} \cdot \text{E}$ ,  $\text{PhCH} \cdot \text{CPh}_3 \cdot 2\text{Li} \cdot \text{E}$ , and the anthracene (A) complexes  $\text{A} \cdot 2\text{Li} \cdot 2\text{E}$  and  $\text{A} \cdot 2\text{Na} \cdot \text{E}$ . In the latter complexes, Schlenk, *et al.* (C.A. 8, 1380), failed to detect the E owing to faulty analysis. The following amine complexes were obtained in soln. in the corresponding amine:  $\text{PhCH} \cdot \text{CPh}_3 \cdot 2\text{Na} \cdot \text{Et}_3\text{N}$  (black),  $\text{PhCH} \cdot \text{CPh}_3 \cdot 2\text{Li} \cdot \text{Et}_3\text{N}$  (carmine-red),  $\text{Ph}_2\text{C} \cdot \text{NPh} \cdot 2\text{Li} \cdot \text{Et}_3\text{N}$  (dark carmine-red),  $\text{Ph}_2\text{C} \cdot \text{NPh} \cdot 2\text{Na} \cdot \text{Et}_3\text{N}$  (carmine red), a Na-A complex in  $\text{Et}_3\text{N}$  (black), Na-A and Li-A complexes in  $\text{PhNMe}_2$  (red), Na- $\text{Ph}_2\text{C} \cdot \text{CPh}_3$  in  $\text{PhNMe}_2$  (black), Na- $\text{Ph}_2\text{C} \cdot \text{NPh}$  in  $\text{PhNMe}_2$  (red), and the corresponding Li complex (purple-red). The presence of 2 metal (M) atoms in the  $\text{PhCH} \cdot \text{CPh}_3$  complexes with  $\text{Et}_3\text{N}$  suggests the structure  $[\text{PhCH} \cdot \text{M} \cdot \text{CPh}_3]^- [\text{M} \cdot \text{NEt}_3]^+$ . Of the 2 possible structures of the  $\text{Ph}_2\text{C} \cdot \text{NPh}$  complexes, the more plausible one is  $[\text{Ph}_2\text{C} \cdot \text{M} \cdot \text{NPh}]^- [\text{M} \cdot \text{NEt}_3]^+$ , i.e., with the metal bound to the C atom rather than the N atom of the  $\text{Ph}_2\text{C} \cdot \text{NPh}$ . The most plausible structures for the  $\text{Et}_2\text{O}$  complexes are, resp.,  $[\text{Ph}_2\text{CLi} \cdot \text{CPh}_3]^- [\text{Li} \cdot \text{OEt}]^+$  and  $[\text{Ph}_2\text{C} \cdot \text{Na} \cdot \text{CPh}_3]^- [\text{Et}_2\text{O} \cdot \text{Na} \cdot \text{OEt}]^+$ . The structures proposed for the other complexes are:  $[\text{PhCH} \cdot \text{M} \cdot \text{CPh}_3]^- [\text{M} \cdot \text{OEt}]^+$ ,  $[\text{Li} \cdot \text{Na}]^+$ ,  $[\text{Na} \cdot \text{OEt}]^+$ , and  $[\text{Li} \cdot \text{Li}]^+$ ,  $[\text{Et}_2\text{O} \cdot \text{Li} \cdot \text{OEt}]^+$ .

CB

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Synthesis of 6-benzylparaconic acids H. M. Mikhailov, Zhur. Obshchei Khim. (J. Gen. Chem.) 21, 330-61 (1951). — Addn. of di-Et benzylsuccinate (80 g.) and 18 g.  $\text{EtO}_2\text{CH}$  to 8 g. Na in 10 g. abs.  $\text{EtOH}$  with ice cooling, keeping 2 days at  $0-2^\circ$  and 5 days at room temp., addn. of ice, extn. with  $\text{Et}_2\text{O}$ , acidification of the aq. layer, and its extn. with  $\text{Et}_2\text{O}$  gave 59.5%  $\text{PhCH}_2\text{CH}(\text{CO}_2\text{Et})\text{CH}(\text{CHO})\text{CO}_2\text{Et}$ . The crude ester reduced with  $\text{Al-Hg}$  (Wollicenus, J. prakt. Chem. 34, 51 (1896)) overnight in  $\text{Et}_2\text{O}$  at  $25^\circ$  in the presence of a little  $\text{H}_2\text{O}$  gave 32.5 g. undistillable  $\text{PhCH}_2\text{CH}(\text{CO}_2\text{Et})\text{CH}(\text{CH}_2\text{OH})\text{CO}_2\text{Et}$ ; this (85 g.) on distn. in vacuum at  $\text{EtOH}$  and yielded 72.8 g. mixed  $\text{Et}$  paraconates which after several distns. were sepd into the solid form, b.p.  $155-160^\circ$ , b.p.  $180-2^\circ$ , and the liquid form, b.p.  $171-2^\circ$ , n<sub>D</sub><sup>20</sup> 1.5150, d<sub>4</sub><sup>20</sup> 1.1802. The latter (51 g.) boiled 4 hrs. with 10%  $\text{HCl}$  gave 4.49 g. 6-benzylparaconic acid (l. m.  $102-3^\circ$  (from  $\text{Et}_2\text{O}$ -petr. ether), while similar hydrolysis of the solid ester gave an acid m.  $134.5-5.0^\circ$  (from  $\text{H}_2\text{O}$ ). The latter kept in vacuo at  $180-200^\circ$  6 hrs. changed its m.p., and when crystd. from  $\text{Et}_2\text{O}$ -petr. ether it m.  $99.5-100.5^\circ$  and did not depress the m.p. of I. G. M. Kowalski

1951

MIKHAYLOV, B. M.

191725

USSR/Chemistry - Pharmaceuticals Jul 51  
Organic Lithium Compounds

"Organic Lithium Compounds of 1, 2-Benzanthracene and Their Conversion," B. M. Mikhaylov, T. K. Kozminskaya, Inst Normal and Pathol Morphol, Acad Med Sci USSR

"Zhur Obshch Khim" Vol XXI, No 7, pp 1276-1283

Org li compds of 1, 2-benzanthracene (not obtainable by action of Li on halogen derivs) are smoothly prep'd by action of n-BuLi or PhLi on halogen derivs and can be used successfully for synthesis of homologues and O derivs of 1, 2-

191725

USSR/Chemistry - Pharmaceuticals Jul 51  
(Contd)

benzanthracene. Synthesis of 10-ethyl-1, 2-benzanthracene and higher homologues requires use of 1, 2-benzanthryl-10-lithium obtained with aid of PhLi.

191725

M KHAYLOV, B. M.

188120

USSR/Chemistry - Phenanthrene  
Derivatives

Aug 51

"Research Into the Phenanthrene Series. I. Syn-  
thesis of Phenanthrene Derivatives With the Aid  
of Organic Lithium Compounds," B. M. Mikhaylov, N.  
G. Chernova, Inst of Gen and Exptl Pathol, Acad  
Med Sci USSR

"Zhur Obshch Khim" Vol XXI, No 8, pp 1517-1524

188120

To synthesize phenanthrene derivs, use of org Li  
compd of Phenanthrene has advantage as to rate of  
conversion and yield over method using org Mg  
compds. Prepd several new phenanthrene derivs  
using org Li compds. Bromination of phenanthrene

188120

USSR/Chemistry - Phenanthrene  
Derivatives (Contd)

Aug 51

add 9-methylphenanthrene with PBr<sub>5</sub> yields 9-bro-  
mophenanthrene and 9-methyl-10-bromophenanthrene,  
resp.

PA 194764

USSR/Chemistry - Benzanthracene Deriva- Dec 51  
tives

"Action of Phosphorus Pentahalides on 1, 2-Benzanthracene and Its Derivatives," B. M. Mikhaylov, T. K. Kozminskaya, Inst of Norm and Pathol Morphol, Acad Med Sci USSR

"Zhur Obshch Khim" Vol XXI, No 12, pp 2184-2188

found that PCl<sub>5</sub> and PBr<sub>5</sub> halogenate compds of 1, 2-benzanthracene series. Action of PCl<sub>5</sub> on 1, 2-benzanthracene (I) and 3, 4'-ace-1, 2-benzanthracene (II) yielded corresponding 10-chloro-derivs. PBr<sub>5</sub> had the same action as Br<sub>2</sub> on I, II, and 9-methyl<sub>12</sub>

194764

USSR/Chemistry - Benzanthracene Deriva- Dec 51  
tives (Contd)

and 10-methyl-1, 2-benzanthracene. PBr<sub>5</sub> reacted with 10-bromo-1, 2-benzanthracene to form 9, 10, 10-tribromo-9, 10-dihydro-1, 2-benzanthracene. Latter conversion occurs in like manner under action of Br<sub>2</sub> in presence of pyridine.

194764

MIKHAYLOV B. M.



USSR/Chemistry - Lithium Compounds 21 May 51

"Constitution of Organic Compounds of Alkali Metals: Lithium Aryls and Their Ether Addition Compounds," L. M. Mikhaylov, N. G. Chernova, Inst Norm and Pechol Morphol, Acad Med Sci USSR

"Dok Ak 'ruk SSSR" Vol LXXVIII, No 3, pp 489-492

Prior work by authors (1950) established that Na and Li derivs of triarylmethyls, phenylated ethylenic hydrocarbons, dehydrodrivis of condensed polynuclear hydrocarbons, and azomethines (organometallic compds that are colored and conduct electricity) are complex compds contg ether or tertiary amine. When

186710

USSR/Chemistry - Lithium Compounds 21 May 51  
(Contd)

phenyl, alpha-naphthyl 9-phenanthryl, or 9-anthryl Li is prep'd by reacting n-BuLi with aryl bromides in benzene, simple ArLi compds are formed. In ether soln, complex Li aryl-ether adducts are formed.

186710

MIKHAYLOV, B. M.

MIKHAYLOV, B. M.

184T10

USSR/Chemistry - Organophosphorus  
Compounds

1 Jun 51

"New Method for the Preparation of Primary Aryl-  
phosphonic Acids," B. M. Mikhaylov, N. F. Kucher-  
ova. Inst Normal and Path Morphol, Acad Med Sci  
USSR

"Dok Ak Nauk SSSR" Vol LXXVIII, No 4, pp 709-711

Describes synthesis of primary arylphosphonic  
acids by reacting lithium aryls with dipiperidine-  
N-oxylchlorophosphine, and subsequent hydrolysis  
of resulting aryldipiperidine-N-oxyphosphines.

184T10

MIKHAYLOV, B. M.

USSR/Chemistry - Sulfur Compounds

21 Sep 51

"A New Type of Reaction Between Thiolic and Unsaturated Compounds," B. M. Mikhaylov, A. N. Blokhina, Inst of Org Chem, Acad Sci USSR

"Dok Ak Nauk SSSR" Vol LXXX, No 3, pp 373-376

The action of thioacetic acid on anthracene occurs at the 9,10 positions and consists of the addn of 2 radicals of  $\text{CH COS}^-$  rather than 2 thiol groups.

210R29

MIKHAYLOV, B. M.

USSR/Chemistry - Pharmaceuticals Jan 52

"Synthesis of Polycyclic Compounds. XVI. Preparation of Meso Derivatives of Anthracene Using Organic Lithium Compounds," B. M. Mikhaylov, V. F. Bronovitskaya, Inst of Gen and Exptl Path, Acad Med Sci USSR

"Zhur Obshch Khim" Vol XXII, No 1. pp 147-162

Studied reaction of meso-halogen derivs of anthracene with n-BuLi and PhLi, leading to formation of org Li compds of anthracene series. PhLi is recommended due to absence of side reactions which occur in case of n-BuLi Prepd

207727

USSR/Chemistry - Pharmaceuticals (Contd) Jan 52

number of meso derivs of anthracene. Replacement of 2 Br atoms in dibromo derivs by 2 Li atoms under action of excess PhLi occurs to inconsiderable extent. Meso-chloro<sup>6</sup>derivs do not react with PhLi. Org Li compds of anthracene series are relatively stable in ether.

207727

USSR/Chemistry - Pharmaceuticals

Jan 52

"Research in the Naphthene Series. I. Addition of Alkali Metals to 1,2,3,4-Tetrahydronaphthene. Conversions of Bimetallic Compounds of 1,2,3,4-Tetrahydronaphthene," B. M. Mikhaylov, A. D. Chmuyeva

"Zhur Obschch Khim" Vol XXII, No 1, pp 162-166

L1 and Na are added to 1,2,3,4-tetrahydronaphthene (I) in ether or in dimethyl ether of ethylene glycol (II). Org L1 compd of I is hydrolyzed by II into mono-L1 compd. Action of CO<sub>2</sub> or MeCl on di-L1 compd of I yielded, resp, 1,2,3,4,6,11-

207T30

USSR/Chemistry - Pharmaceuticals (Contd) Jan 52

hexahydronaphthene-6,11-dicarboxylic acid or 6,11-dimethyl-1,2,3,4,6,11-hexahydronaphthene in form of cis- and trans-isomers.

207T30

MIKHAYLOV, B. M.

MIKHAYLOV B.M.  
USSR/Chemistry - Phosphorus Organic Compounds  
Medicine - Cancerogenic substances

May 52

"Synthesis of Triaryl Phosphines and Triaryl Phosphine Oxides Using Lithium Organic Compounds;

B. M. Mikhaylov, N. F. Kucherova; Inst of Normal and Pathological Morphology, Acad Med Sci  
USSR.

Zhur Obshch Khim, 22, No 5, pp 792-797, 1952

Aromatic Li compds can be used as reagents for the synthesis of carbocyclic phosphorus compds. Triaryl phosphines are obtained by the action of lithium aryls on  $PCl_3$ , and triaryl phosphine oxides are formed by the reaction between lithium aryls and phosphorus oxichloride. With this method, the simplest members of the groups of phosphine derivs contng both tri- and tetracyclic hydrocarbon radicals can be obtained.

CHINAYEVA, A.D.  
MIKHAYLOV, B.M.; CHINAEVA, A.D.

Naphthacene series. II. Lithium-organic compounds of 1,2,3,4-tetra-  
hydronaphthacene and their transformations. Zhur. Obshchey Khim. 22,  
1887-90 '52. (MLRA 5:11)  
(CA 47 no.14:6924 '53)

MIKHAYLOV, B. M.

USSR/Chemistry - Organo-Lithium Compounds 11 Jun 52

"Complex Formation in a Series of Organic Compounds of Lithium, B. M. Mikhaylov, N. G. Chernova, Inst of Normal and Pathol Morphol, Acad Med Sci SSSR

"Dok Ak Nauk SSSR" Vol LXXXIV, No 5, pp 967 - 970

There are 9 theoretically possible types of compds of lithium having a coordination number of 4. They are complexes of lithium with ethers, dioxanes, amines, and hydrocarbon radicals. Complex compds of aromatic Li derivs were also found to exist. Dioxane and amine complexes were prepd. Presented by Acad A. N. Nesmeyanov 8 Apr 52.

223713



MIKHAYLOV, B.M.; CHERNOVA, W.G.

Structure of metallic compounds of aromatic ketones. Doklady Akad.  
Nauk S.S.S.R. 85, 341-4 '52. (MLRA 5:8)  
(CA 47 no.15:7467 '53)

MIKHAYLOV, B.M.

Naphthalene series. III. Organometallic compounds of and the sum of wts. of Li and naphthalene (as dihydro naphthalene and their transformations. B. M. Mikhailov, deriv.) gave the wt. of the complexed ether. The results and A. D. Chingayev. *Sbornik State Obshch. Khim., Akad.* indicate that the complex was  $C_{10}H_8Li_2 \cdot 2Et_2O$ . Shaking NaOH S.S.S.R. 1, 628-4 (1953); cf. C.A. 48, 44036. Alkali, 0.1 g. naphthalene, 0.01 g. Li, and 15 ml.  $Et_2O$  200 hrs., metals add to naphthalene in the presence of  $Et_2O$  or  $CH_2Cl_2$ , followed by addn. of  $MeOH \cdot Et_2O$  gave a ppt. which was DMe), yielding heteropolar complexes which contain ethers. sublimed to yield 0.07 g. naphthalene while the cry. soln. Heating 1 g. 1,2,3,4-tetrahydronaphthalene with 0.4 g. Se gave 0.023 g. 6,11-dihydronaphthalene (II), m. 206-7°; 10 hrs. at 280° gave 80.5% naphthalene, m. 345-6°; 8 gives similar reaction with Na instead of Li gave 60% II; the (the same yield. All following reactions with alkali metals were complex in this case was blue. Dry ice and I kept 26 hrs. run under N. Shaking 0.5 g. naphthalene, 0.05 g. Li and 6 gave 71.4% 6,11-dihydronaphthalene-6,11-dicarboxylic acid, ml.  $(MeOCH_2)_2$  80 hrs. at room temp. gave a green-colored, decomp. 263-65°. In the form of mixed cis-trans isomers, yent, and the combined filtrate and washings were evapd.  $EtOH$ , neutral products were obtained. If the reaction in vacuo yielding 0.776 g. black complex which treated with  $CH_2Cl_2$  (with Li) is treated with  $MeCl$ , there is obtained  $MeOH \cdot Et_2O$  gave an orange ppt.; this was taken up in  $CH_2Cl_2$ , mixed 6,11-dimethyl-6,11-dihydronaphthalene (III): 1 isomer, and the soln. was washed with  $H_2O$ ; the aq. layer was m. 163-4°, the other, m. 106-7.5°. Oxidation of III with titrated for its Li content, while the org. layer was evapd. chromic acid in  $AcOH$  at room temp. gave 6,11-naphtha- G. M. Kosolapoff. to dryness, the difference between the wt. of the complex. *consequens*, m. 289-92°.

MIKHAYLOV, S.M.

# USSR.

Naphthalene series. IV. Synthesis of alkyl- and aryl derivatives of 1,2,3,4-tetrahydronaphthalene. B. M. Mikhaylov and A. D. Chibacyn. *Soviet State Chem.* 1983-8 (1983); cf. C.A. 49; 903b. -- To Makhg from 20.4 g. H<sub>2</sub>O to 120 ml. H<sub>2</sub>O was added 6 g. 1,2,3,4,6,11-hexahydronaphthalene-6-one in 200 ml. CCl<sub>4</sub> and the mixt. was refluxed 3 hrs., allowed to stand overnight, and treated with ice and NH<sub>4</sub>Cl; the org. layer gave 63.1% 6-methyl-1,2,3,4-tetrahydronaphthalene, m. 127-8°. Identical with that formed through the Li deriv. (cf. C.A. 47; 6924g). Similar reaction with R<sub>2</sub>MgI gave 23.2% 6-ethyl-1,2,3,4-tetrahydronaphthalene, m. 77-8°, while PhMgBr similarly gave 30.2% 6-Ph analog, m. 142-3°, which for purification was passed over Al<sub>2</sub>O<sub>3</sub> in petr. ether. The reaction with Ph-CH<sub>2</sub>MgCl, however, gave 49.5% 6-benzyl-1,2,3,4,6,11-hexahydronaphthalene-6-ol, m. 133.5-6° (from Me<sub>2</sub>CO). This refluxed in CCl<sub>4</sub> with a few drops concd. HCl 1 hr. gave 32.9% 6-benzyl-1,2,3,4-tetrahydronaphthalene, m. 135-6° (from CCl<sub>4</sub>). O. M. Kozlov

MIKHAYLOV, B.M.

USSR

THEORY OF THE DIMERIZATION OF AROMATIC RINGS

It is shown that the spectra of the monomers are identical, but the spectra of the dimers are radically different from that of the monomers. From a comparison of their properties and spectra the structure of these two forms is determined. It is shown that in the dimerization a redistribution of the bonds in the mol. occurs and, in 1, the aromatic ring structure is lost in the center ring.

Levina, L. A.

MIKHAYLOV, B. M.

Structure of the molecule of dimers of anthracene and its homologous substances. V. S. Medvedev, B. M. Mikhaylov, A. F. Prikhot'ko, and O. P. Kharlamov. *Izvest. Akad. Nauk S.S.S.R., Ser. Fiz.* 17, 716-18 (1953).—Pure 9-methylanthracene (m. 79.5–80.5°) was transformed into its dimer (m. 228–228.5°) by irradiation of its acetone soln. by a Hg arc-lamp and recrystn. Absorption spectra of the crystals show 2 electronic transitions. The first series of broad absorption bands begins with a strongly polarized triplet  $\lambda = 3990.1; 4004.5; 4030.6$  Å.; the second series has a long-wave limit of absorption at  $\lambda = 2560$  Å. for one polarization and 2800 Å. for the other. This spectrum is entirely different from the monomer spectrum. The photochem. reaction takes place not only in soln. but also by irradiation of monomer crystals; it can be detd. by the loss of birefringence. The transformation is effected by a change in the valence bond which leads to a configuration similar to that of hydrated anthracene derivs. The aromatic structure is lost in the central ring.

S. Pakswar

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11-10-54

MIKHAYLOV, S. M.

Orientation phenomena in substitution reactions with  
participation of organic compounds of the alkali metals. B.  
M. Mikhaylov and V. P. Bronovitskaya. J. Gen. Chem.  
U.S.S.R. 23, 127-31 (1958) (Engl. translation).—See C.A.  
48, 6584.  
B. L. H.

Chem Abs

4.48 25 Jan 74

Organic Chem

Orientation phenomena in substitution reactions with participation of organic compounds of the alkali metals. B. M. Mikhailov and V. P. Bronovitskaya. *Zh. Obshch. Khim.* 23, 123-4 (1953).—Refusing 5 g. 2-ethylanthraquinone, 4.5 g. Sn, and 34 ml. AcOH was treated over 2 hrs. with 11.5 ml. concd. HCl, then dild. with H<sub>2</sub>O yielding methylanthrone, which was refluxed 3 hrs. with 6 g. Zn dust and 100 ml. 2N NaOH yielding 72.7% 2-methylanthracene, m. 208-9°. This (3 g.) in 75 ml. cold CS<sub>2</sub> was treated slowly with 2.5 g. Br in CS<sub>2</sub>; after heating on a steam bath until H<sub>2</sub> evolution ceased, the reaction mixt. yielded 75% crude or 83% pure 2-methyl-9-bromoanthracene (I), m. 94.5-5.5° (from EtOH). Adm. of 2 g. 2-methyl-9,10-dibromoanthracene to 0.0058 mols PhLi in Et<sub>2</sub>O and hydrolysis of the mixt. after 0.5 hr. with MeOH-Et<sub>2</sub>O, and H<sub>2</sub>O, gave 24% I, m. 93-5°; the mother liquor gave a mixt. (0.81 g.) of 2-methyl-9 (and 10)-bromoanthracenes

m. 43-53°. Similarly 0.0037 moles PhLi in soln. treated with 1 g. 2-methyl-9-bromoanthracene, then treated with 1.58 g. MeI gave 68.7% 2,9-dimethylanthracene, m. 81-2° BuLi (from 1.4 g. BuCl, 0.21 g. Li, and 30 ml. Et<sub>2</sub>O) treated with 2 g. I, kept 0.5 hr. then poured on Dry Ice, gave 51.7% 2-methylanthracene-9-carboxylic acid, m. 197-8° [cf. Liebermann, *Ann.* 212, 35 (1882); *C.A.* 6, 2602]. This (0.9 g.) treated with 0.63 g. Br in CS<sub>2</sub> at 0°, then heated on steam bath as above, gave 50% 2-methyl-9-bromo-10-anthracenecarboxylic acid, m. 229-30.5° (from C<sub>6</sub>H<sub>6</sub>). Oxidized with CrO<sub>3</sub> in AcOH it gave 2-methylanthraquinone. To 3 g. 2-methyl-9,10-dibromoanthracene was added 0.729 g. PhLi in Et<sub>2</sub>O-C<sub>6</sub>H<sub>6</sub>; after 90 min. the mixt. was treated with Dry Ice yielding 69% 2-methyl-9-bromoanthracene-10-carboxylic acid, m. 235-8° (decompn. from dild. EtOH). Thus organometallic compds. of alkali metals behave as nucleophilic reagents. In such compds. with the metal being in o-position in respect to a neg. substituent there is established a link between the metal and the hetero-atom, that is similar to a H-bond, which apparently controls the orientation phenomena. G. M. K.

MIKHAYLOV, B. M.; KOZMINSKAYA, T. K.

Benzant racene

Synthesis of derivatives of 3, 4'-ace-1 2-benzant racene with the aid of various reagents. Zhur. ot. khim. 23, No. 3, 1951.

9. Monthly List of Russian Accessions, Library of Congress, \_\_\_\_\_ 1953, Unclassified.



MIKHAYLOV, B.M.; KOZMINSKAYA, T.K.

Synthesis in the benzanthrane series with the aid of lithium reagents.  
Zhur.ob.khim. 23 no.7:1220-1224 J1 '53. (MLBA 6:7)

1. Institut normal'noy i patologicheskoy morfologii Akademii meditsinskikh  
nauk SSSR. (Benzanthracene series) (Lithium)

USSR/ Chemistry Organic chemistry

Card : 1/1 Pub. 40 - 12/27

Authors : Mikhaylov, B. M., and Ter-Sarkisyan, G. S.

Title : Condensation reactions of benz-derivatives of 9-methylacridine. Part 3.-  
Condensation with p-nitrosodimethylaniline

Periodical : Izv. AN SSSR. Otd. khim. nauk 4, 656 - 662, July - August 1954

Abstract : The condensation of 9-methylacridine, 9-methyl-1,2-benzacridine, 9-methyl-1,2,7,8-dibenzacridine, 4-methyl-5,6-benzquinoline and 4-methyl-7,8-benzquinoline with p-nitrosodimethylaniline, was investigated to determine the activity of the methyl groups, of the above mentioned compounds, in relation to the number and orientations of the benzene rings in the molecule. The effect of ultraviolet rays, on the rate of condensation reaction, is explained. It was found that 9-methylacridine condenses easily with p-nitrosodimethylaniline in darkness, at room temperature and without the aid of catalysts. Other results are described. Ten references: 3 USSR; 2 USA; 2 Swiss and 3 German (1911 - 1951).

Institution : Acad. of Sc. USSR, The N. D. Zelinskiy Institute of Organic Chemistry

Submitted : June 23, 1953

MIKHAYLOV, B.M.

Relative reactivity of methyl groups of benzene analogs of  
4-methylnitrobenzene: B. M. Mikhailov and G. S. Ter-Sar-  
gisyan. Bull. Acad. Sci. U.S.S.R., Div. Chem. Sci. 1984,  
781-7 (Engl. translation) — See C.A. 49, 18994i.

B. M. R.

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USSR/Organic Chemistry - Synthetic Organic Chemistry, E-2

Abst Journal: Referat Zhur - Khimiya, No ., 1957, 901

Author: Mikhaylov, B. M., and Ter-Sarkisyan, G. S.

Institution: Academy of Sciences USSR

Title: Relative Reactivity of the Methyl Group in the Benzene Homologs of 4-Methylpyridine

Original  
Periodical: Izv. AN SSSR, Section on Chemical Sciences, 1954, No 5, 846-853

Abstract: The reactivity of the  $\text{CH}_3$ -group in picoline (I), lepidine (II), 5,6-benzolepidine (III), 7,8-benzolepidine (IV), 9-methylacridine (V), 9-methyl-1,2-benzacridine (VI), 9-methyl-3,4-benzacridine (VII), 9-methyl-1,2,7,8-dibenzacridine (VIII), and 9-methyl-3,4,5,6-dibenzacridine (IX) has been studied in the condensation with  $m\text{-NO}_2\text{C}_6\text{H}_4\text{CHO}$  (X). It has been established that the reactivity of the investigated compounds in the reaction is expressed by the series  $\text{I} > \text{II} > \text{II} > \text{IV}$  and  $\text{V} > \text{VI} > \text{VII} > \text{VIII} > \text{IX}$  and, as a result, that the mobility of the hydrogen of the  $\text{CH}_3$ -group in the benzene homologs of I depends

Card 1/3

USSR/Organic Chemistry - Synthetic Organic Chemistry, E-2

Abst Journal: Referat Zhur - Khimiya, No 1, 1957, 961

Abstract: both on the number and on the position of the benzene nuclei condensed with the pyridine molecule. A mixture of 0.19 mole of  $\beta,\beta$ -dinaphtylamine, 0.19 mole  $(CH_3CO)_2O$  (XI), and 26 gms anhydrous  $ZnCl_2$  is heated for 5 hours at  $185-190^\circ$ . The  $CH_3COOH$  is distilled off and the residue heated 30 minutes at  $250-260^\circ$ , followed by repeated treatment with 10%  $H_2SO_4$  and neutralization with 25%  $NH_4OH$ ; VIII is obtained in yields of 46.8% (crude), mp  $180-183^\circ$  (successive crystallization from benzene, ethylacetate, and alcohol). Chromatographic purification of crude VIII yields an isomer with mp  $215-216^\circ$ . A mixture of 2.7 moles of II and 5 ml of XI is heated in a sealed tube for 1.5 hours at  $150-153^\circ$ ; the contents of the tube are dissolved in 20 ml  $C_6H_6$ . The solution is treated with 30 ml 6 N HCl; 4-(m-nitrostyryl)-pyridine is obtained by the neutralization of the HCl-solution (yield, 48.2%); the unreacted II is recovered as the semicarbazone after extraction with benzene (yield 47.85%, based on II charged). Similar procedures were used in the condensation of the above-named benzene homologs of I with X and of II with  $o-NO_2C_6H_4CHO$ . A mixture of 2.2 moles of the hydrochloride of III, 2.2 moles of X, and 1.5 mole of XI is refluxed 3 hours; 10 ml of water are added after cooling and the solution is

Card 2/3

USSR/Organic Chemistry - Synthetic Organic Chemistry, E-2

Abst Journal: Referat Zhur - Khimiya, No 1, 1957, 961

Abstract: made alkaline with 25%  $\text{NH}_4\text{OH}$ . The precipitate is washed twice with 3-ml portions of alcohol; the yield of m-nitro-benzylidene-5,6-benzolepidine is 30%, mp 168-169° (from alcohol). Similar methods were used in the synthesis of n-dimethyl-aminobenzylidene-5,6-benzolepidene in yields of 26.9%, mp 170.5-171.5° (from alcohol); m-nitrobenzylidene-5,6-benzolepidine in yields of 21.0%, mp 155-157° (successive crystallization from methyl and ethyl alcohol); and 9-(n-dimethylaminostyryl)-2-methylacridine in yields of 94% (crude), mp 225-226° (successive crystallization from  $\text{CH}_3\text{OH}$  and a mixture of benzene and petroleum ether). Condensation of V and X under UV-irradiation yields  $\alpha$ -(m-nitrophenyl)- $\beta$ -( $\gamma$ -acrydil)-ethanol (XII): a mixture of 7 mmoles of V, 7 mmoles of X, and 14 ml of  $\text{C}_6\text{H}_6$  is irradiated with UV light for 100 hours in a  $\text{N}_2$ -atmosphere; the yield of XII is 54%, mp 146.5-147.5° (successive crystallization from benzene and dioxane). Similar methods were used in the condensation of X with II, III, and VI.

Card 3/3

MIKHAYLOV, B.M.

USSR/Geology - Minerals

Card 1/1 : Pub. 22 - 37/49

Authors : Mikhaylov, B. M.

Title : Mineralogical-petrographic characteristics of the erosion crust in the north-western part of the Turgansk depression

Periodical : Dok. AN SSSR 98/4, 645-647, Oct. 1, 1954

Abstract : The mineralogical-petrographic properties of the erosion crust of the north-western part of the Turgansk depression are described. Seidelite, which is gradually being displaced by kaolinite and montmorillonite, appear to be the basic minerals of the erosion crust. Three USSR references (1949-1954). Drawing.

Institution : All-Union Scientific Research Geological Institute

Presented by : Academician D. V. Nalivkin, June 26, 1954

*MIKHAYLOV, B. M.*

USSR/Chemistry - Boron organic compounds

Card 1/1 Pub. 22 - 25/47

Authors : Mikhaylov, B. M., and Aronovich, P. M.

Title : Complex boron-organic compounds. Diisobutoxydiphenylboronlithium and triisobutoxyphenylboronlithium.

Periodical : Dok. AN SSSR 98/5, 791-794, Oct 11, 1954

Abstract : The reaction of phenyl lithium (PhLi) with diisobutyl phenylborate and triisobutyl borate, was investigated for the purpose of obtaining complex B-organic compounds. Two component compounds, formed during the reaction of PhLi with diisobutyl phenylborate, were analyzed. The entire reaction process, and the results obtained, are described in detail. Fourteen references: 6-German; 5-USA; 2-USSR and 1-French (1862-1953).

Institution : Acad. of Sc. USSR, The N. D. Zelinskiy Institute of Organic Chemistry

Presented by : Academician B. A. Kazanskiy, May 27, 1954



MIKHAYLOV, B.M.

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Preparation of p-terphenyl. B. M. Mikhailov and P. M.  
Atanovich. Bull. Acad. Sci. U.S.S.R., Div. Chem. Sci.  
1949, 857-8 (Engl. translation).—See C.A. 50, 4080g.  
B. M. R.

PM

MIKHAYLOV, B.M.

The complex nature of dimethyl compounds of phenazine.  
B. M. Mikhaylov and N. N. Glukhina (N. D. Zelinskii Inst.  
Org. Chem., Moscow). Izvest. Akad. Nauk S.S.S.R.,  
Dokl. Akad. Nauk 1955, 350-52; cf. C.A. 44, 9482e.  
Dimethyl compounds of phenazine obtained in  $(CH_3O)_2$  are  
complexes of several moles of the ether, the nature depend-  
ing on the nature of the metal as shown below. The  
products conduct current and are ionic; one atom of the  
metal is a complex cation, the 2nd is covalently bound with  
the negatively charged mol. of phenazine. All these work  
was done under N. To 0.5 g. 9,10-dihydrophenazine in 9  
ml.  $(CH_3O)_2$  was added 30 ml.  $Et_2O$  soln. of  $PhLi$  contg.  
3 equiv. of  $PhLi$ ; the brown ppt. was sepd. and dried in  
vacuo to const. wt., treated under  $Et_2O$  with  $MeOH$ , then  
with  $H_2$ , and the aq. soln. was analyzed for  $Li$ ; the wt.  
difference between the complex and the corrected wt. of  
phenazine and  $Li$  indicated that the complex was  $C_{12}H_{10}N_2$   
 $22.6(CH_3O)_2$ ; its molar cond. was  $0.252\text{ cm}^2\text{ ohm}^{-1}$ .  
To a soln. of di-Na deriv. of anthracene prepd. by shaking  
1 g. anthracene and 0.3 g. Na 25 hrs. in  $(CH_3O)_2$ , was  
added 0.7 g. dihydrophenazine in 10 ml.  $(CH_3O)_2$ ; the  
red-brown ppt. was sepd. and identified as  $C_{12}H_{10}N_2 \cdot 2Na$ .

$(CH_3O)_2$ , molar cond.  $0.328\text{ cm}^2\text{ ohm}^{-1}$ . To the  
filtered red soln. of disodiumphenanthrene, prepd.  
by shaking 4.5 g. benzophenone, 1.1 g. Na and 80 ml.  
 $Et_2O$ , was added 0.6 g. phenazine in 50 ml.  $Et_2O$ ; the ppt.  
was sepd. and identified as  $C_{12}H_{10}N_2 \cdot 2Na \cdot Et_2O$ . If the  
prepn. is made with but a slight excess of the di-Na deriv.,  
the product varies much in metal content (cf. Schlenk and  
Bergmann, C.A. 22, 4499). O. M. Kozlov

MIKHAYLOV, B. M.

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1. Organoboron compounds. III. Preparation of isobutyl  
esters of propylphenylboric and butylphenylboric acids.  
B. M. Mikhaylov and P. M. Aronovich (N. D. Zelinski  
Inst. Org. Chem., Moscow). *Izv. Akad. Nauk S.S.S.R.*  
*Khim. Nauk* 1963, 940-7; *Ch. C.A.* 49, 13142g; 50,  
4813d. — A soln. of  $\text{PrLi}$  prepd. at 0° from 32 g.  $\text{PrBr}$ , 8.6  
g.  $\text{Li}$ , and 200 ml.  $\text{Et}_2\text{O}$  treated over 30–40 min. at –60°  
with 46.8 g.  $\text{PhB}(\text{OC}_2\text{H}_5)_2$  in 50 ml.  $\text{Et}_2\text{O}$ ; stirred 6  
hrs. at –70°, kept overnight, and, with dry  $\text{HCl}$ , freed of  
the bulk of solvent, filtered from the  $\text{LiCl}$  and  $\text{LiBr}$ , evaporated  
in vacuo, redistilled, and fractionated yielded 85.8%  $\text{Pr}$ -  
 $\text{PhB}(\text{OC}_2\text{H}_5)_2$ , b.p. 86–7°,  $n_D^{20}$  0.8913. Similarly was  
prepd. 97.4%  $\text{BuPhBOC}_2\text{H}_5$ , b.p. 96–7°,  $n_D^{20}$  0.8914.  
All operations were performed under dry  $\text{N}_2$ . O. M. K.

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